

EXHIBIT 1

5. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

6. This Court has specific and general personal jurisdiction over the defendant pursuant to due process and/or the Texas Long Arm Statute, because the defendant has committed acts giving rise to this action within Texas and within this judicial district. The Court's exercise of jurisdiction over the defendant would not offend traditional notions of fair play and substantial justice because the defendant has established minimum contacts with the forum. For example, on information and belief, the defendant has committed acts of infringement in this judicial district, by among other things, selling and offering for sale products that infringe the asserted patent, directly or through intermediaries, as alleged herein.

7. Venue is proper in this Court pursuant to 28 U.S.C. §§ 1391 and 1400(b). Google is registered to do business in Texas. Google has offices in this District, has transacted business in this District, and has committed acts of direct and indirect infringement in this District. Google also has a regular and established place of business in this District, as set forth below.

8. Since 2007, Google has employed "hundreds" of employees in this District in Austin, Texas.¹ As of August 2018, Google had more than 800 employees in Austin.² By June of 2019, Google had more than 1,100 employees in Austin.³ In January 2019, it was reported that Google "signed a lease for an entire 35-story tower that has started construction just east of the

¹ According to Gerardo Interiano, Google's public affairs and government relations manager, in a statement. See <http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/>

² See <https://www.statesman.com/news/20190131/source-google-to-occupy-35-story-office-tower-in-downtown-austin>

³ See <https://www.bizjournals.com/austin/news/2019/06/14/google-confirms-austin-expansion-will-begin-moving.html>

Central Library in downtown Austin.”⁴ Google’s 35-story tower in Austin “will have 790,000 square feet of space, enough to potentially house about 5,000 people.”⁵



Source: <https://www.statesman.com/news/20190131/source-google-to-occupy-35-story-office-tower-in-downtown-austin>

9. Articles report that Google’s office in Austin would “would certainly be one of its most expansive offices in North America.”⁶

10. Google has 300,000 square feet of office space in Austin, Texas, at 500 West 2nd Street.⁷ Google also has offices on North MoPac Expressway,⁸ University Park, and Austin’s Children Museum.⁹

⁴ *Id.*

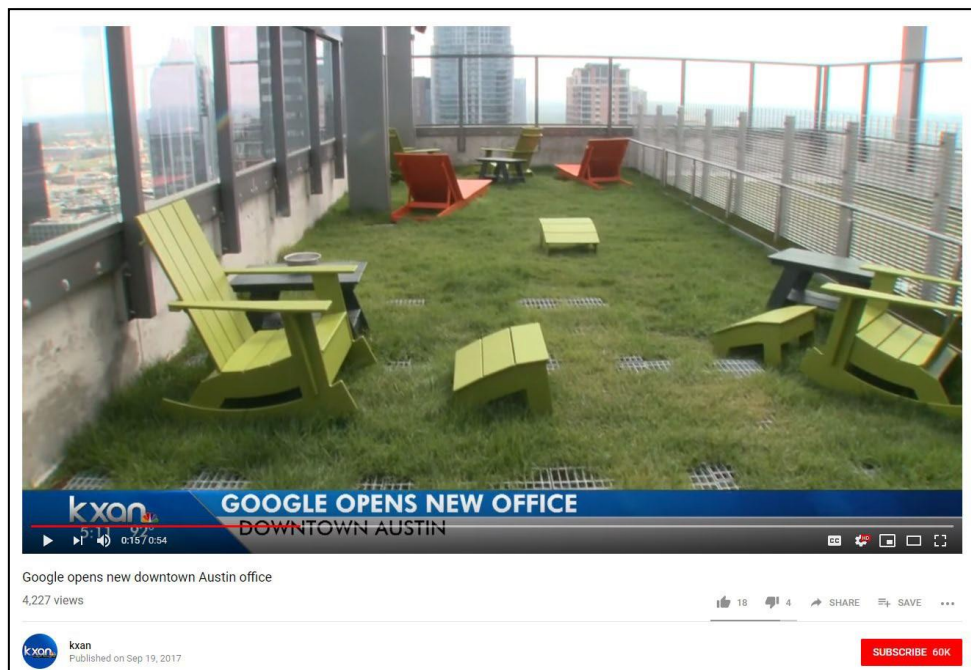
⁵ *Id.*

⁶ See <https://9to5google.com/2019/01/31/google-signs-lease-austin-campus/>

⁷ See <https://www.bizjournals.com/austin/news/2020/02/27/google-to-invest-10b-in-offices-and-data-centers.html>

⁸ See <https://www.google.com/intl/en/about/locations/?region=north-america>

⁹ See <http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/>



Source: <https://www.youtube.com/watch?v=RKA1RJYGOYQ>



Source: <https://www.bizjournals.com/austin/news/2019/10/28/inside-austins-coolest-offices.html#g/419929/15>

11. Google has, as of June 2020, fifty (50) job postings for Austin, TX.¹⁰

12. Google's taxed appraised property values in Travis County (Austin) are approximately \$1 billion.¹¹ Google's taxed appraised property values in McLennan County (Waco) are approximately \$75,000.¹² Google's taxed appraised property values in Bexar County (San Antonio) are approximately \$50 million.¹³ Google's taxed appraised property values in El Paso are approximately \$258,000.¹⁴

13. Operationally, Google is a multinational technology company that collects, stores, organizes, and distributes data. In addition to its service model for distribution of data (e.g., movies, search results, maps, music, etc.), Google has an expansive regime that gathers data on residents of this District through the hardware devices it sells (e.g., phones, tablets, and home audio devices) and, also, through the operating systems and apps it provides. As an example, Google gathers data when a resident runs its operating systems and apps (e.g., location services).¹⁵ As another example, Google gathers data when a resident interacts with Google's plethora of services such as search, email, and music and movie streaming. See <https://safety.google/privacy/data/> (indicating that Google gathers data from "things you search for," "Videos you watch," "Ads you view or click," "Your location," "Websites you visit," and "Apps, browsers, and devices you use to access Google services"). As yet another example, Google gathers data by listening and recording everything a resident says within proximity of one of its products, such as Google

¹⁰

<https://careers.google.com/jobs/results/?company=Google&company=YouTube&hl=en&jlo=en-US&location=Austin,%20TX,%20USA>

¹¹ See <http://propaccess.traviscad.org>

¹² See https://propaccess.trueautomation.com/clientdb/Property.aspx?cid=20&prop_id=378970

¹³ See https://bexar.acttax.com/act_webdev/bexar/showdetail2.jsp?can=000001265355

¹⁴ See <http://www.epcad.org/Search?Keywords=GOOGLE+INC&Year=2019>

¹⁵ See e.g., "AP Exclusive: Google tracks your movements, like it or not," <https://apnews.com/828aefab64d4411bac257a07c1af0ecb/AP-Exclusive:-Google-tracks-your-movements,-like-it-or-not>

Home.¹⁶ Others have reported that Google gathers “where you’ve been,” “everything you’ve ever searched – and deleted,” “all the apps you use,” “all of your YouTube history,” “which events you attended, and when,” “information you deleted [on your computer],” “your workout routine,” “years’ worth of photos,” and “every email you ever sent.”¹⁷

14. Google takes these massive amounts of gathered data on residents of this District and monetizes them, for example, through targeted advertising. Some have reported that “creepy” advertisements for items never searched for, but only spoken out loud, appeared. *See e.g.*, <https://www.youtube.com/watch?v=zBnDWSvaQ1I> (conducting test on the term “dog toys” spoken out loud, but never searched; tester claims targeted “dog toy” advertisements only appeared after speaking the phrase out loud).

15. In addition to extensive data gathering of information on residents of this District, Google has a substantial presence in the District directly through the products and services Google provides residents of this District (some of which also gather data).¹⁸ One of Google’s main businesses in this District is delivering information, including digital content such as movies, music, apps, and advertising.

¹⁶ *See* <https://www.unilad.co.uk/technology/google-is-listening-to-everything-we-say-and-you-can-hear-it-back/> (“Tech giant and the font of all pub quiz knowledge, Google, can quietly record many of the conversations that people have in close proximity to its products.”).

¹⁷ *See* <https://www.theguardian.com/commentisfree/2018/mar/28/all-the-data-facebook-google-has-on-you-privacy>.

¹⁸ Non-limiting examples include Google Search, Maps, Translate, Chrome Browser, YouTube, YouTube TV, Google Play Music, Chromecast, Google Play Movies and TV, Android Phones, Android Wear, Chromebooks, Android Auto, Gmail, Google Allo, Google Duo, Google+, Google Photos, Google Contacts, Google Calendar, Google Keep, Google Docs, Google Sheets, Google Slides, Google Drive, Google Voice, Google Assistant, Android operating system, Project Fi Wireless phone systems, Google Pixel, Google Home, Google Wifi, Daydream View, Chromecast Ultra.

16. Google describes itself as an “information company.”¹⁹ Its vision is “to provide access to the world’s information in one click,” and its mission is “to organize the world’s information and make it universally accessible and useful.”²⁰ Making information available to people wherever they are and as quickly as possible is critical to Google’s business.

Google Global Cache (GGC)

17. As Google’s CEO, Sundar Pichai, explains, “We want to make sure that no matter who you are or where you are or how advanced the device you are using—Google works for you.”²¹ To meet this goal, Google developed a content delivery network that it calls the Edge Network.

18. One non-limiting example of physical presence in this District is Google’s Edge Network. Google provides web-based services, such as YouTube, YouTube TV, and Google Play, to users throughout the world. These services are in high demand. Google reports that Google Play reaches more than 1 billion Android users and that YouTube serves over 1.8 billion users per month.²² Studies show that YouTube alone is responsible for approximately 20% of all internet traffic.²³ YouTube TV, which has been described as an “add-on to YouTube” allows Google to essentially become the local TV provider for residents of this District. For example, residents in this District obtain local Waco-Temple-Bryan area channels such as KXXV, ABC (Channel 25); KBTX, CBS (Channel 3) or KWTX, CBS (Channel 10); KCEN NBC (Channel 5); and KCEN,

¹⁹ See “This Year’s Founder’s Letter” by Alphabet CEO, Sundar Pichai, <https://blog.google/inside-google/alphabet/this-years-founders-letter/>.

²⁰ See <http://panmore.com/google-vision-statement-mission-statement>.

²¹ See e.g., <http://time.com/4311233/google-ceo-sundar-pichai-letter/>.

²² See <https://www.theverge.com/2018/5/3/17317274/youtube-1-8-billion-logged-in-monthly-users-brandcast-2018>

²³ See <https://www.sandvine.com/hubfs/downloads/archive/2016-global-internet-phenomena-report-latin-america-and-north-america.pdf> and <http://testinternetspeed.org/blog/half-of-all-internet-traffic-goes-to-netflix-and-youtube/>

Fox (Channel 6).²⁴ To verify a resident should receive such local channels, Google verifies the location of such resident.

19. Google's Edge Network, itself, has three elements: Core Data Centers, Edge Points of Presence, and Edge Nodes. The Core Data Centers (there are eight in the United States) are used for computation and backend storage. Edge Points of Presence are the middle tier of the Edge Network and connect the Data Centers to the internet. Edge Nodes are the layer of the network closest to users. Popular content, including YouTube TV, YouTube, video advertising, music, mobile apps, and other digital content from the Google Play store, is cached on the Edge Nodes, which Google refers to as Google Global Cache or "GGC."

20. Google Global Cache is recognized as "one of Google's most important pieces of infrastructure,"²⁵ and Google uses it to conduct the business of providing access to the world's information. GGC servers in the Edge Nodes function as local data warehouses, much like a shoe manufacturer might have warehouses around the country. Instead of requiring people to obtain information from distant Core Data Centers, which would introduce delay, Google stores information in the local GGC servers to provide quick access to the data.

21. Caching and localization are vital for Google's optimization of network resources. Because hosting all content everywhere is inefficient, it makes sense to cache popular content and serve it locally. Doing so brings delivery costs down for Google, network operators, and internet service providers. Storing content locally also allows it to be delivered more quickly, which improves user experience. Serving content from the edge of the network closer to the user improves performance and user happiness. To achieve these benefits, Google has placed Edge Nodes

²⁴ See, e.g. <https://thestreamable.com/markets/waco-temple-bryan-tx>.

²⁵ See <http://blog.speedchecker.xyz/2015/11/30/demystifying-google-global-cache/>.

throughout the United States, including in this District. Google describes these nodes as the workhorses of video delivery.

22. Just like brick-and-mortar stores, Google's GGC servers independently determine what content to cache based on local requests. The GGC servers in Google's Edge Nodes include software that Google refers to as "µstreamer." µstreamer is responsible for serving video content from YouTube and other Google services, along with other large content such as Google Play applications and Chrome downloads. It operates on a content-delivery platform at the edge of Google's network called "bandaid"; it does not run in the core (except for some internal testing purposes), unlike the majority of the Google services, such as search or gmail.

23. Using µstreamer and bandaid, a GGC server handles requests directly from its clients, predominantly YouTube's video players. When such a request is received, if the content is stored in the node's local cache, the node will serve it to the end user, improving the user experience and saving bandwidth. If cache-eligible content is not already stored on the node, and the content is cache-eligible, the node will retrieve it from Google, serve it to the user, and store it for future requests.

24. µstreamer is largely autonomous, in the sense that almost all decisions related to serving a particular request are made locally, without coordinating with other servers. Like a brick-and-mortar store sells directly to customers from inventory and stocks that inventory based on local customer demand, µstreamer in each GGC node decides—independently from other nodes in Google's Edge Network— whether to serve requested content, whether to cache content, and whether to send requests to other servers.

25. Google's GGC servers are housed in spaces in the District leased by Google. Google's GGC servers are housed in spaces leased by Google from Internet Service Providers (ISPs) whose networks have substantial traffic to Google and are interested in saving bandwidth.

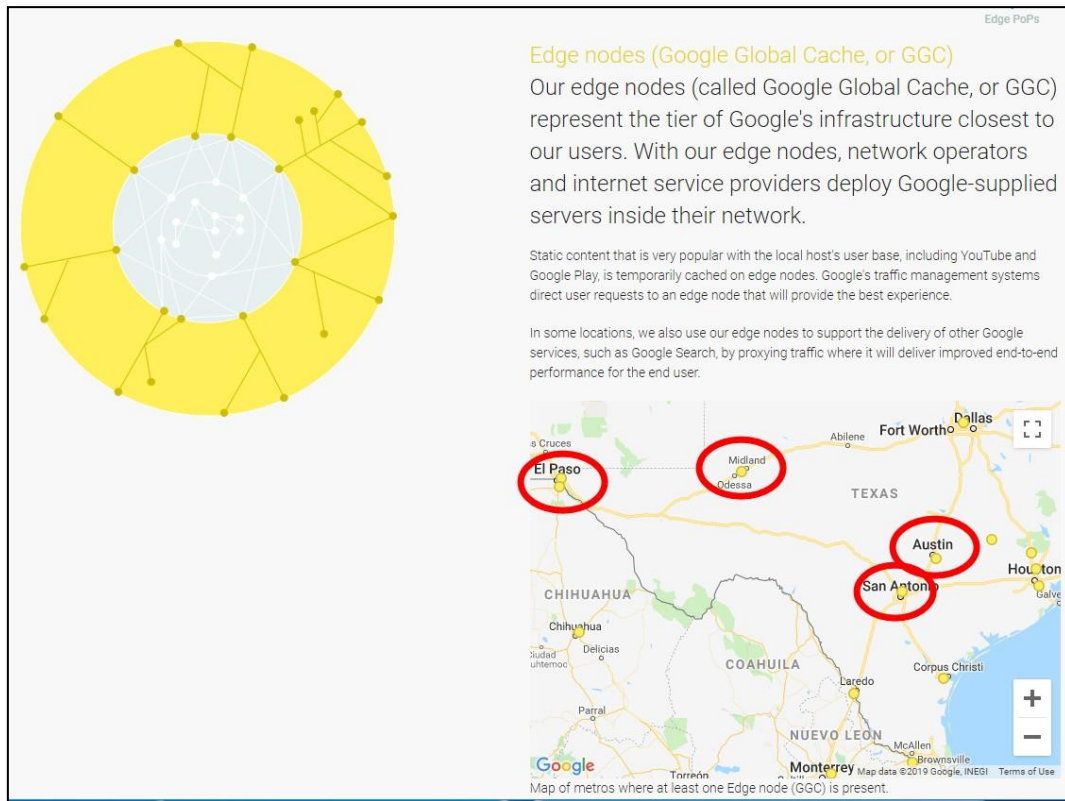
Hosting Google servers allows ISPs to save both bandwidth and costs, as they do not incur the expense of carrying traffic across their peering and/or transit links.

26. When an ISP agrees to host a GGC server, the parties enter into a Global Cache Service Agreement, under which Google provides:

- hardware and software—including GGC servers and software—to be housed in the host's facilities;
- technical support; service management of the hardware and software; and
- content distribution services, including content caching and video streaming.

In exchange, the host provides, among other things, a physical building, rack space where Google's computer hardware is mounted, power, and network interfaces. All ownership rights, title, and intellectual property rights in and to the equipment (i.e., the hardware and software provided by Google) remain with Google and/or its licensors.

27. Multiple ISP hosted GGC servers are in this District. Google's website identifies Midland, El Paso, Austin, and San Antonio as GGC server locations. Each of these cities is located in this District.



Source: <https://peering.google.com/%23/infrastructure>

28. The Office of Telecommunications Services for the University of Texas, for example, is an ISP that hosts two GGC servers in Austin, Texas.²⁶

29. Google caches content on the GGC servers located in this District.

30. Google's GGC servers located in this District cache content that includes, among other things: (i) video advertising; (ii) apps; and (iii) digital content from the Google Play store.

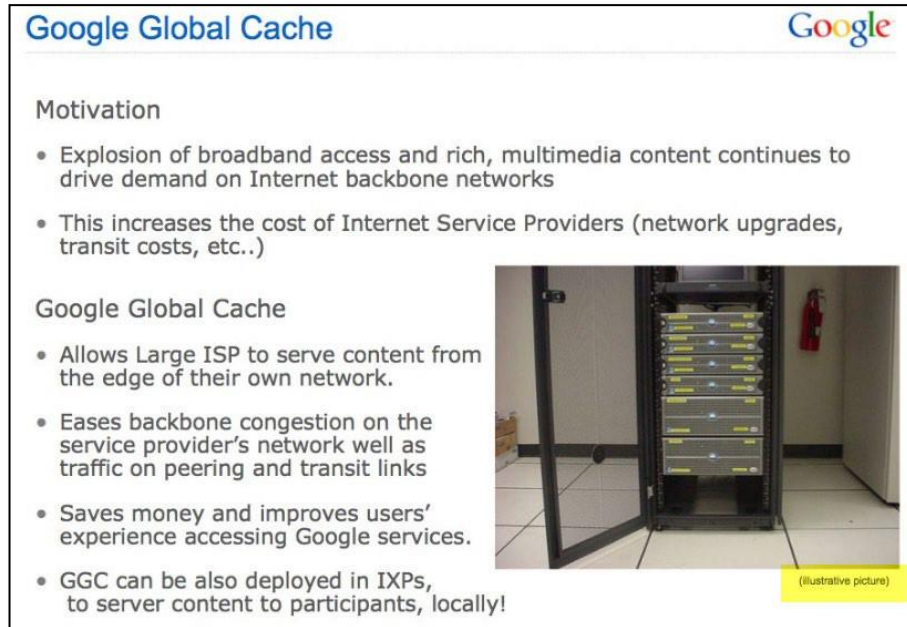
31. Google's GGC servers located in this District deliver cached content for the items in the preceding paragraph to residents in this District.

32. Google generates revenue (i) by delivering video advertising, (ii) from apps, and (iii) from digital content in the Google Play store.

²⁶ See <https://it.utexas.edu/ots-caching-and-peering>

33. Google treats its GGC servers in this District the same as it treats all of its other GGC servers in the United States.

34. The photograph below shows an “illustrative picture” of a Google GGC server.



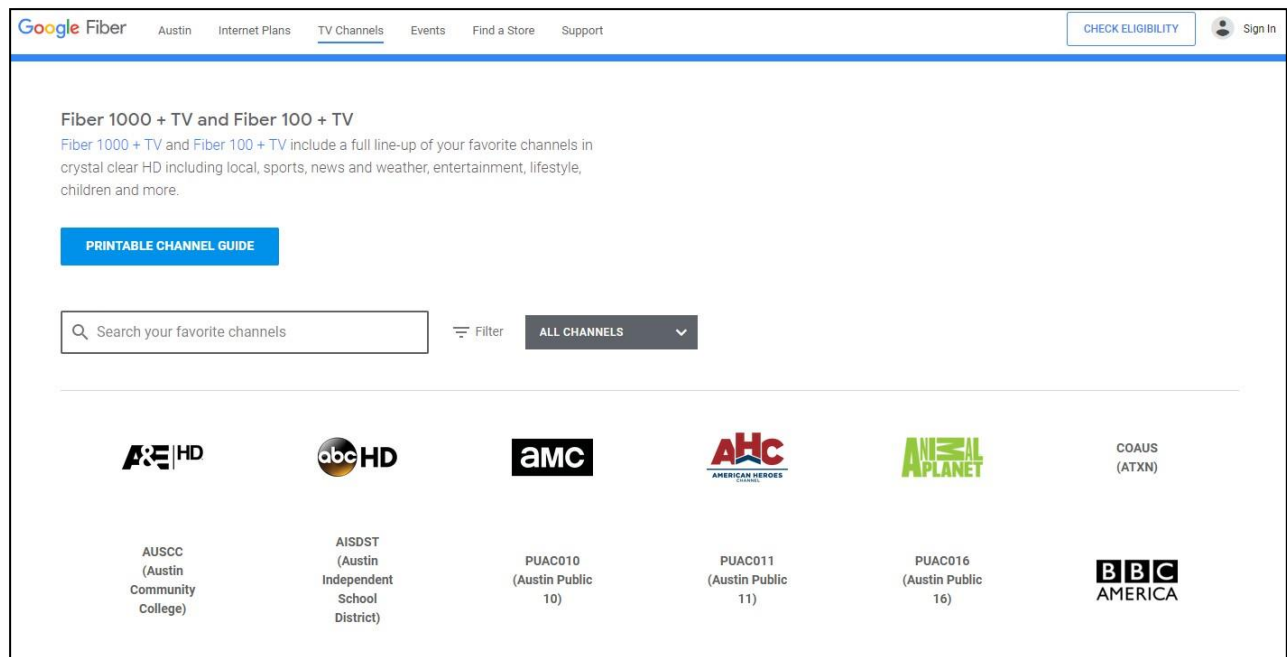
Source: <https://www.wired.com/2010/03/google-traffic/>

35. Google not only exercises exclusive control over the digital aspects of the GGC, Google, but also exercises exclusive control over the physical server and the physical space within which the server is located and maintained.

Google's Communication Services

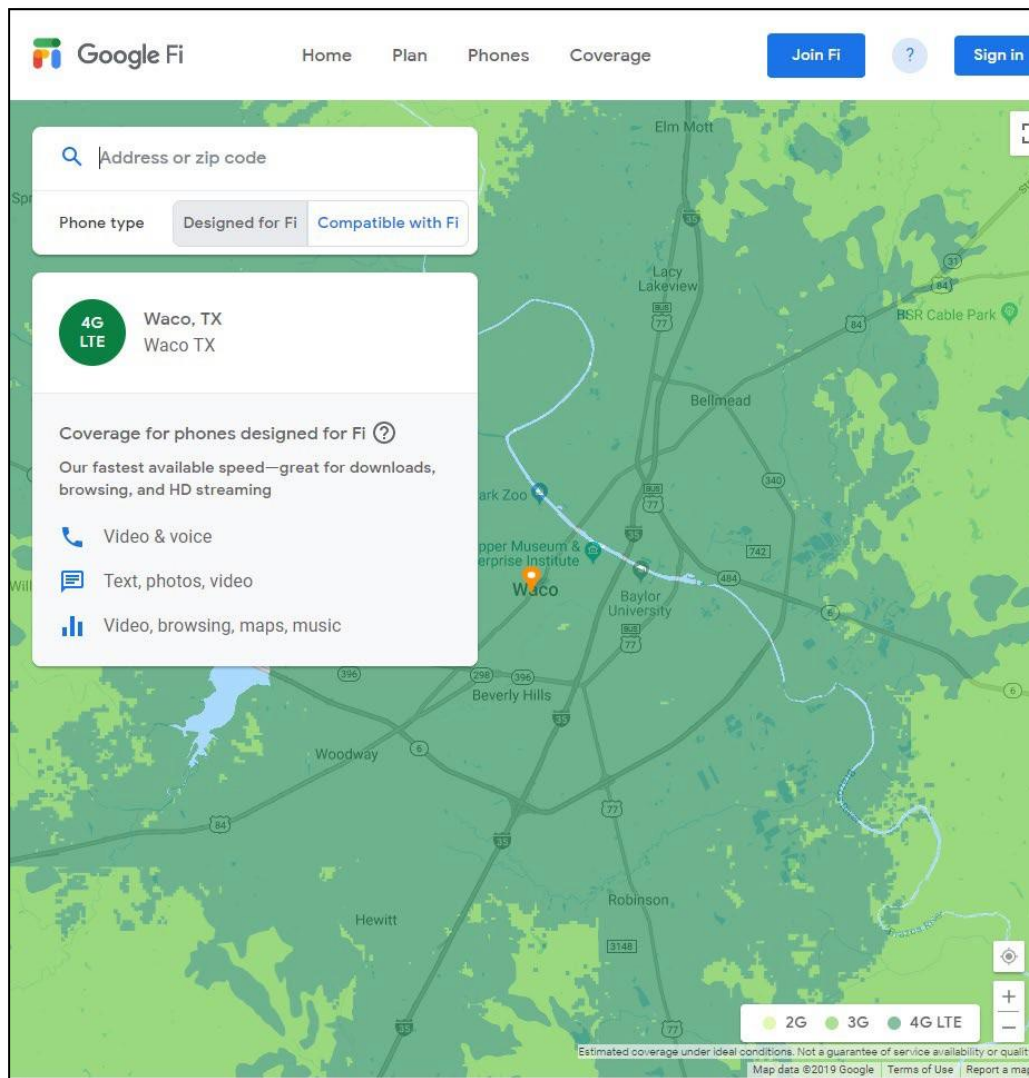
36. Google provides both data and television services to both San Antonio and Austin.²⁷

²⁷ <https://fiber.google.com/ourcities/>



Google's Cell Phone Service (aka Google Fi)

37. Google also provides phone, messaging, and data services in this District from its wireless phone services called Google Fi. Via the Google Fi service, Google provides its customers voice and high-speed data coverage (4G LTE) for cities such as Waco.



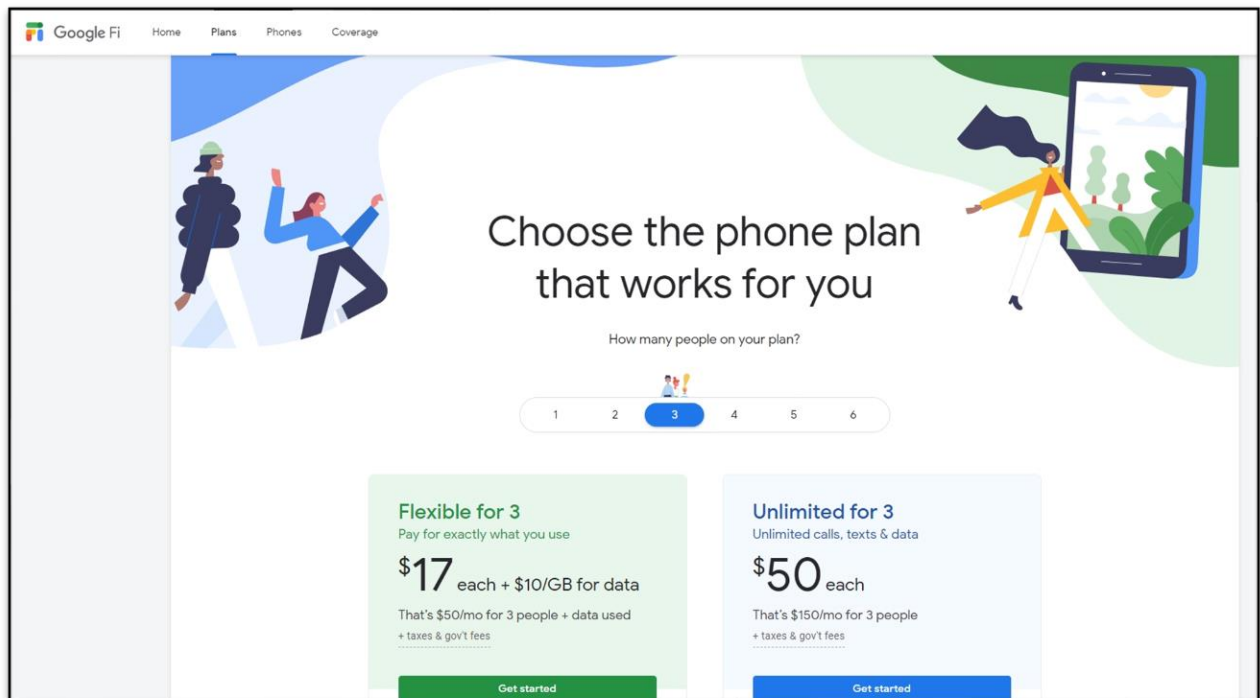
Source: <https://fi.google.com/coverage?q=Waco%2C%20tx>

38. The cell towers used for Google’s services are fixed geographical locations. They are “regular” and “established” because they operate in a “steady, uniform, orderly, and methodical manner” and are sufficiently permanent. They are “of the defendant” because Google has contractual and/or property rights to use the cell towers to operate its business. Google also ratifies the service locations through its coverage lookup service.

39. With this coverage lookup service, Google advertises its ability to provide cell coverage in this District and its selected cell towers in and near this District to provide the advertised coverage (e.g., 2G, 3G, or 4GLTE) depending on the location in the District. *See*

<https://fi.google.com/coverage?>. Google is not indifferent to the location of its cell towers. It “established” and “ratified” their geographic placement to achieve specific business purposes.

40. Residents of this District also directly contract with and are billed by Google for these services as their telecommunications provider.



Source: <https://fi.google.com/about/plan>

41. Google also determines which cell tower a particular Google Fi customer will use while within the District.

✓ What determines when Project Fi moves me between cellular networks?

When multiple carriers are available, Project Fi will move you to the network that our analysis shows will be fastest in your current location, whether that is 4G LTE, 3G, or 2G. We're constantly learning and improving, to account for factors such as newly-built towers or newly-available radio frequencies. And if your current network is providing weak or no coverage, we'll adjust in real time to find you a stronger connection.

Source: <https://fi.google.com/about/faq/#network-and-coverage-4>

COUNT ONE - INFRINGEMENT OF U.S. PATENT NO. 8,803,697

42. Brazos re-alleges and incorporates by reference the preceding paragraphs of this Complaint.

43. On August 12, 2014, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,803,697 (“the ‘697 Patent”), entitled “Detecting movement for determining characteristics of user notification” A true and correct copy of the ‘697 Patent is attached as Exhibit A to this Complaint.

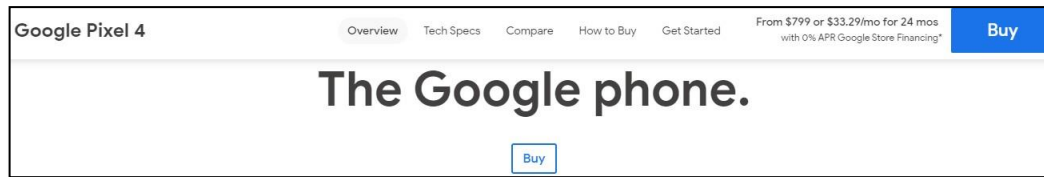
44. Brazos is the owner of all rights, title, and interest in and to the ‘697 Patent, including the right to assert all causes of action arising under the ‘697 Patent and the right to any remedies for the infringement of the ‘697 Patent.

45. Google makes, uses, sells, offers for sale, imports, and/or distributes in the United States, including within this judicial district, products such as, but not limited to, user notification alerts based on the object movement detected using radar (collectively, the “Accused Products”).

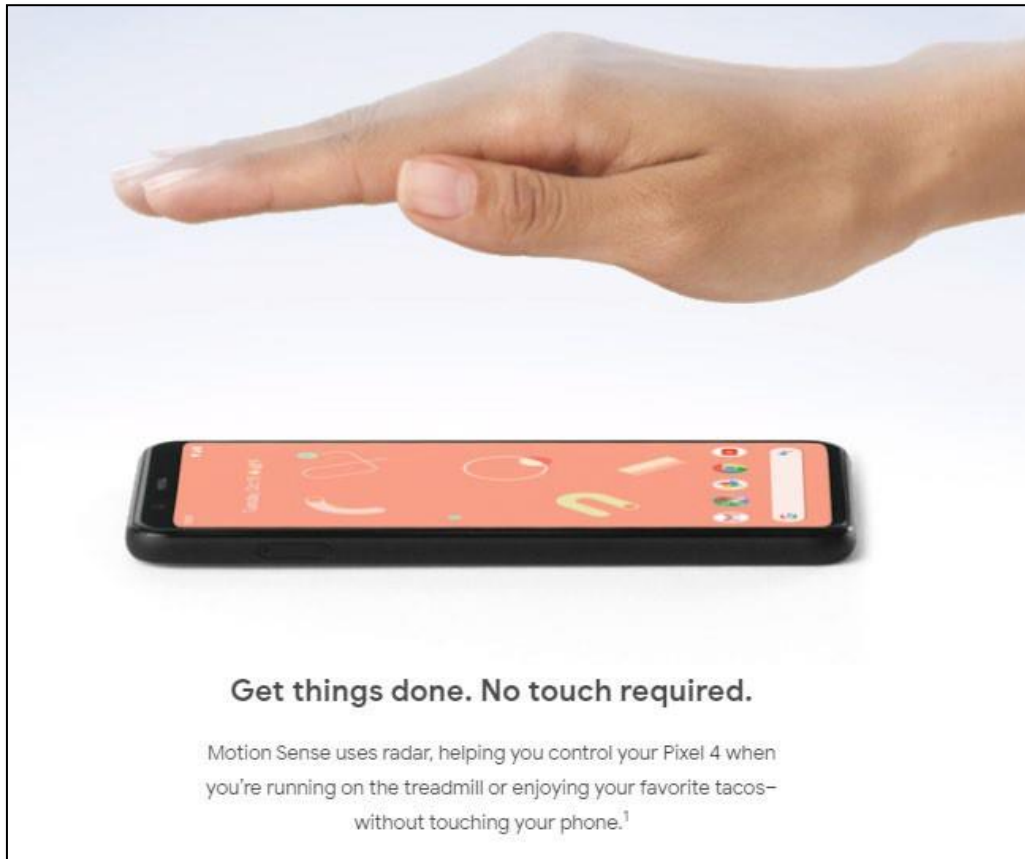
46. The Accused Products include, but are not limited to, devices that utilize Motion Sense, Quick Gestures, Sleep Sensing, and Presence Sensing, such as, but not limited to the Pixel 4 (including the XL variant), the Nest Hub 2nd Generation, and Google Home in combination with the Nest Thermostat.

47. Below are exemplary summaries and descriptions of the Accused Products and non-limiting examples of how the Accused Products infringe the ‘697 Patent. Further details of these theories are set out in Brazos’s April 6, 2022 Proposed Amended Final Infringement Contentions.

48. Pixel 4 is a smartphone provided by Google. Pixel 4 ships with the Motion Sense which uses RADAR technology to provide gesture control to its users.



Source: https://store.google.com/us/product/pixel_4

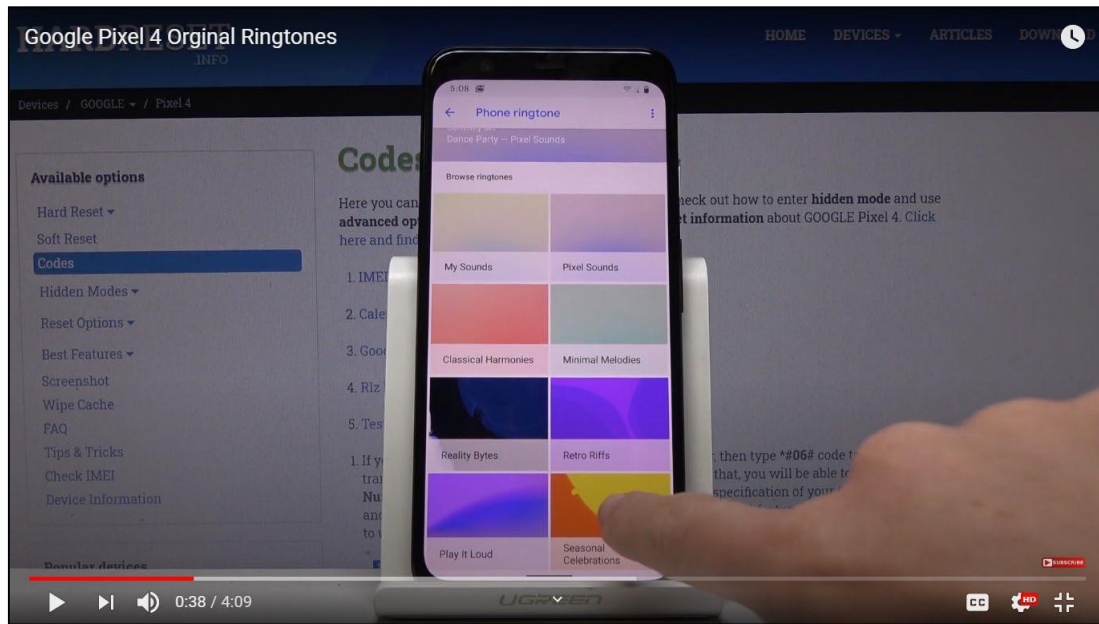


Source: https://store.google.com/us/product/pixel_4

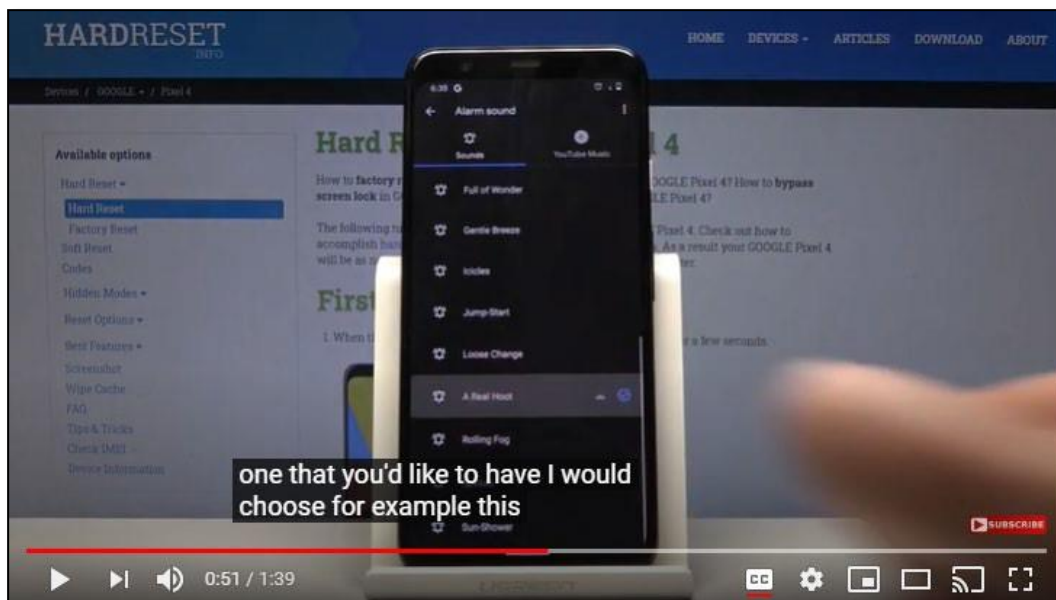
49. The Pixel 4 has internal storage that stores notification sounds for a corresponding event. As an example, for a call event, a user can set a different ringtone. For an alarm notification, the user can select different notification sounds.

Google Pixel 4		Overview	Tech Specs	Compare	How to Buy	Get Started
Memory & Storage						
6 GB LPDDR4x			64 GB or 128 GB*			

Source: https://store.google.com/us/product/pixel_4_specs



Source: https://youtu.be/tx_1WaKCuo, Time 0:12 - 3:52



Source: <https://www.youtube.com/watch?v=LRhr3XCcp4Y>, Time 0:51 - 1:39

50. The Pixel 4 plays (i.e. triggers) the ringtone /notification tone set by the user when the accused product receives (or, detects) an incoming call as shown.



Source: <https://youtu.be/dDqH9EstUsA>, Time 0:18 – 1:20

51. The Pixel 4 has an integrated Soli radar chip to facilitate interaction with the phone without any contact. The Soli radar chip comprises a short-range radar sensor that detects the movement of a user (i.e. external object).



Source: <https://ai.googleblog.com/2020/03/soli-radar-based-perception-and.html>

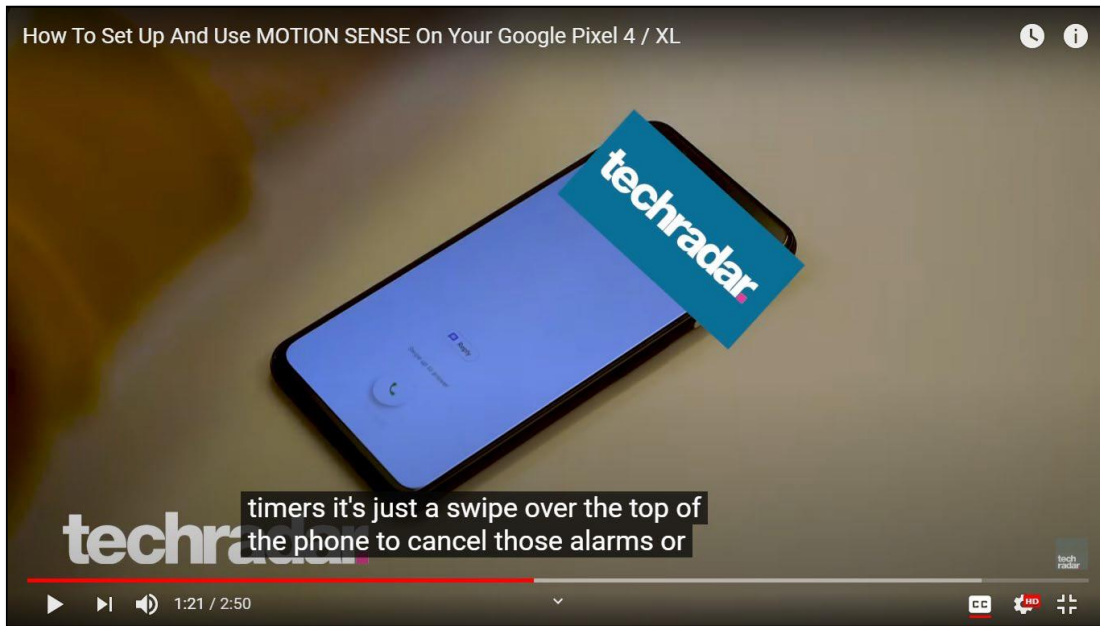
The technology behind Motion Sense is [Soli](#), the first integrated short-range [radar](#) sensor in a consumer smartphone, which facilitates close-proximity interaction with the phone without contact. Below, we discuss

Source: <https://ai.googleblog.com/2020/03/soli-radar-based-perception-and.html>

The Pixel 4 and Pixel 4 XL are optimized for ease of use, and a key feature helping to realize this goal is [Motion Sense](#), which enables users to [interact with their Pixel](#) in numerous ways without touching the device. For example, with Motion Sense you can use specific gestures to change music tracks or instantly silence an incoming call. Motion Sense additionally detects when you're near your phone and when you reach for it, allowing your Pixel to be more helpful by anticipating your actions, such as by priming the camera to provide a seamless [face unlock](#) experience, politely lowering the volume of a ringing alarm as you reach to dismiss it, or turning off the display to save power when you're no longer near the device.

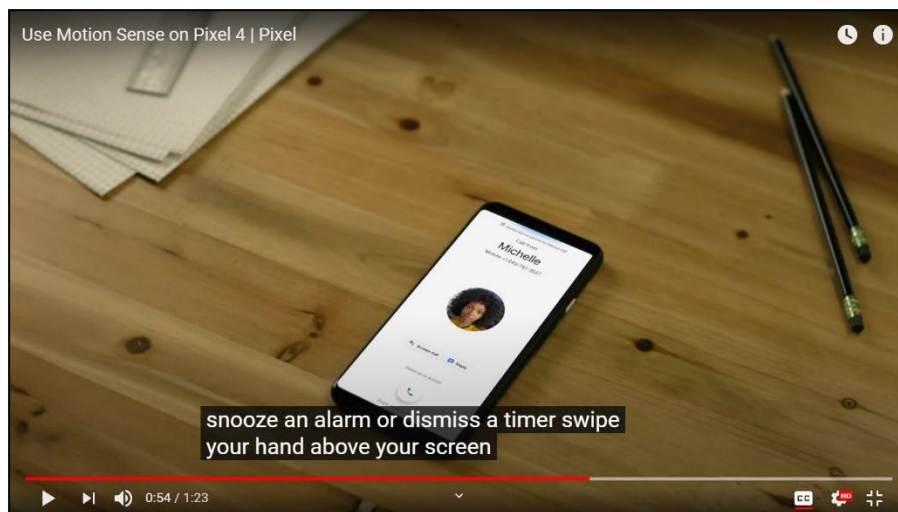
Source: <https://ai.googleblog.com/2020/03/soli-radar-based-perception-and.html>.

52. The Pixel 4 having the Soli radar chip detects the gesture of a user (i.e. movement of an external object) at the time of an incoming call and can silent the notification tone of the call based on the detection of the movement.



Source: <https://youtu.be/dDqH9EstUsA>, Time 1:20 – 1:23

53. The Pixel 4 silences the notification (i.e. changes the characteristics) concerning the incoming call, based on the detection of a user gesture (i.e. the step of detecting movement).



Source: <https://youtu.be/mvvHEYjtsnI>, Time 0:49 – 0:55

The Pixel 4 and Pixel 4 XL are optimized for ease of use, and a key feature helping to realize this goal is **Motion Sense**, which enables users to **interact with their Pixel** in numerous ways without touching the device. For example, with Motion Sense you can use specific gestures to change music tracks or instantly silence an incoming call. Motion Sense additionally detects when you're near your phone and when you reach for it, allowing your Pixel to be more helpful by anticipating your actions, such as by priming the camera to provide a seamless **face unlock** experience, politely lowering the volume of a ringing alarm as you reach to dismiss it, or turning off the display to save power when you're no longer near the device.

Source: <https://ai.googleblog.com/2020/03/soli-radar-based-perception-and.html>.

54. The Nest Hub 2nd Generation is a smart home mobile communications device, provided by Google, which uses radar technology to provide gesture control and sleep monitoring to its users through the Soli radar chip using the Motion Sense technology also incorporated into the Pixel 4. See <https://support.google.com/googlenest/answer/10388741?hl=en>; see also <https://atap.google.com/soli/products/#nest-hub>.

55. The Nest Hub 2nd Generation includes internal storage that stores notifications, including sounds, associated with corresponding events. As an example, for an alarm event, different alert notification tones can be associated with the alarm event.

Set and manage alarms and media alarms

You can set general alarms, play your favorite music, or choose a character as an alarm with just your voice. Alarms will sound for 10 minutes if not stopped or snoozed.

Alarm tones can be changed on Nest displays once you start an alarm. You can't change general alarm tones on speakers.

Source: <https://support.google.com/googlenest/answer/7071598>

56. The Nest Hub 2nd Generation detects an alarm event, such as the alarm time being reached, and triggers the associated user notification alert, such as the associated alarm notification tone.



Source: <https://m.youtube.com/watch?v=elXc31VDOIE>, Time 1:33 – 1:37

57. The Nest Hub 2nd Generation has an integrated Soli radar chip to facilitate interaction with the device without any contact. The Soli radar chip comprises a short-range radar sensor that detects the movement of a user.

58. The Nest Hub 2nd Generation uses the Soli radar chip to detect the gesture of a user (i.e. movement of an external object) at the time of an alarm, or a timer expiring, and can snooze the alarm or stop the timer.

Meet the second-gen Nest Hub from Google,⁴ featuring Quick Gestures enabled by Soli technology. Quick Gestures help you quickly take action and focus on what matters. Play or pause a song or video, snooze an alarm, or even stop a timer with a wave of your hand. In the kitchen or on your bedside table, Nest Hub is the center of your helpful home.

Source: <https://atap.google.com/soli/products/#nest-hub>

59. The Nest 2nd Generation silences the notification concerning the alarm or timer, based on the detection of a user gesture .



Source: <https://m.youtube.com/watch?v=elXc31VDOIE>, Time 1:33 – 1:37

60. The Nest 2nd Generation utilizes the integrated Soli Motion Sense technology for sleep tracking to see how much sleep the user is getting and to track sleep quality, a feature marketed by Google as Sleep Sense.

Sleep Sensing in second-gen Nest Hub demonstrates the first wellness application of Soli. Soli's ability to sense implicit movement from a distance is well suited for sleep tracking because you don't need to wear a device (and remember to charge it) for it to work. Furthermore, radar is a much more private sensor than a camera, which is fitting for something that you invite into a private space like a bedroom.

Source: <https://atap.google.com/soli/products/#sleep-sensing>

61. Sleep Sense utilizes the Soli radar chip Motion Sense technology also present in the Pixel 4 to detect movement from the user. This includes movement of the entire body, and user respirations.

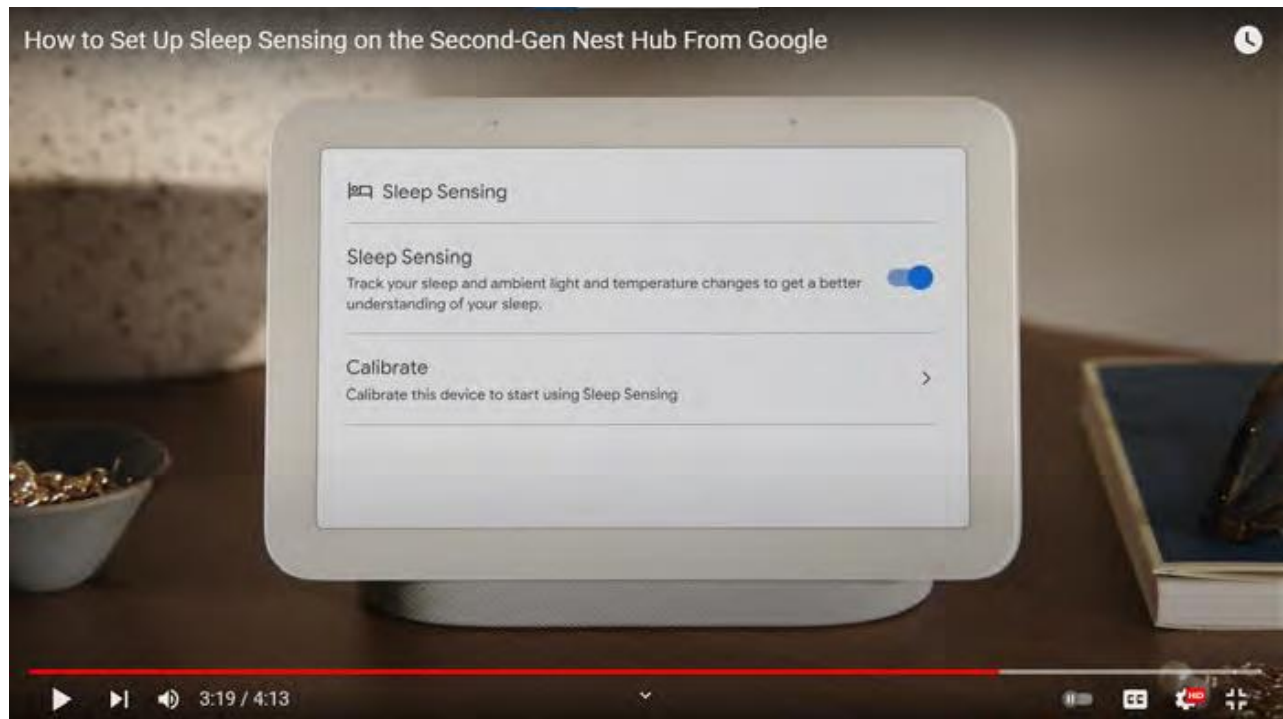
Soli for Sleep Tracking

Sleep Sensing in Nest Hub demonstrates the first wellness application of Soli, a miniature radar sensor that can be used for gesture sensing at various scales, from a finger tap to movements of a person's body. In Pixel 4, Soli powers Motion Sense, enabling touchless interactions with the phone to skip songs, snooze alarms, and silence phone calls. We extended this technology and developed an embedded Soli-based algorithm that could be implemented in Nest Hub for sleep tracking.

Soli consists of a millimeter-wave frequency-modulated continuous wave (FMCW) radar transceiver that emits an ultra-low power radio wave and measures the reflected signal from the scene of interest. The frequency spectrum of the reflected signal contains an aggregate representation of the distance and velocity of objects within the scene. This signal can be processed to isolate a specified range of interest, such as a user's sleeping area, and to detect and characterize a wide range of motions within this region, ranging from large body movements to sub-centimeter respiration.

Source: <https://ai.googleblog.com/2021/03/contactless-sleep-sensing-in-nest-hub.html>

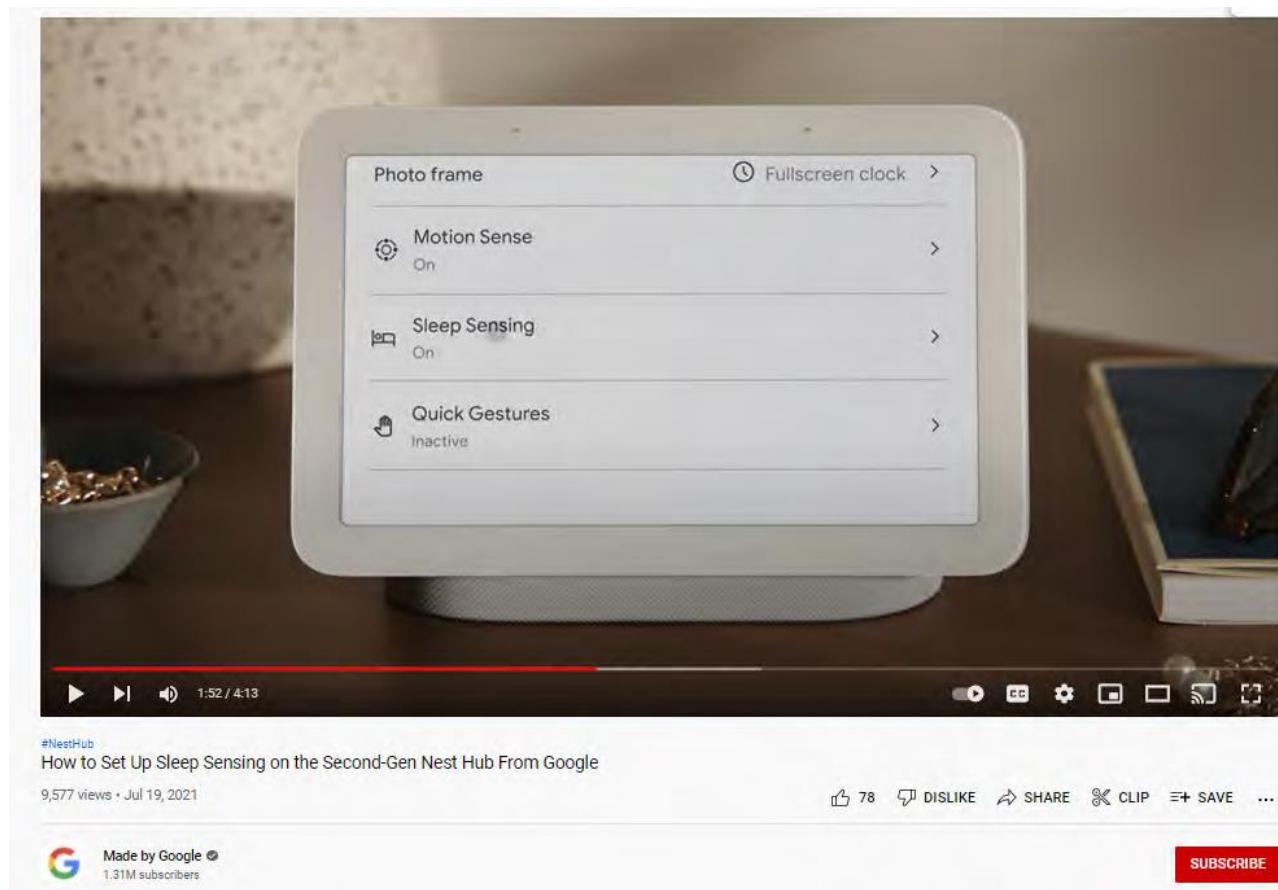
62. The Nest Hub 2nd Generation has internal storage to store information providing an association between the initiation of Sleep Sensing and Sleep Summary information notification alerts.



Source: <https://www.youtube.com/watch?v=vLjHeViM1ic>, Time 3:19

The Hub features a 60 Hz TFT touchscreen display powered by Amlogic S905D system-on-chip (SoC), a quad-core Arm Cortex-A55 architecture, and 2 GB of DDR3 SDRAM.

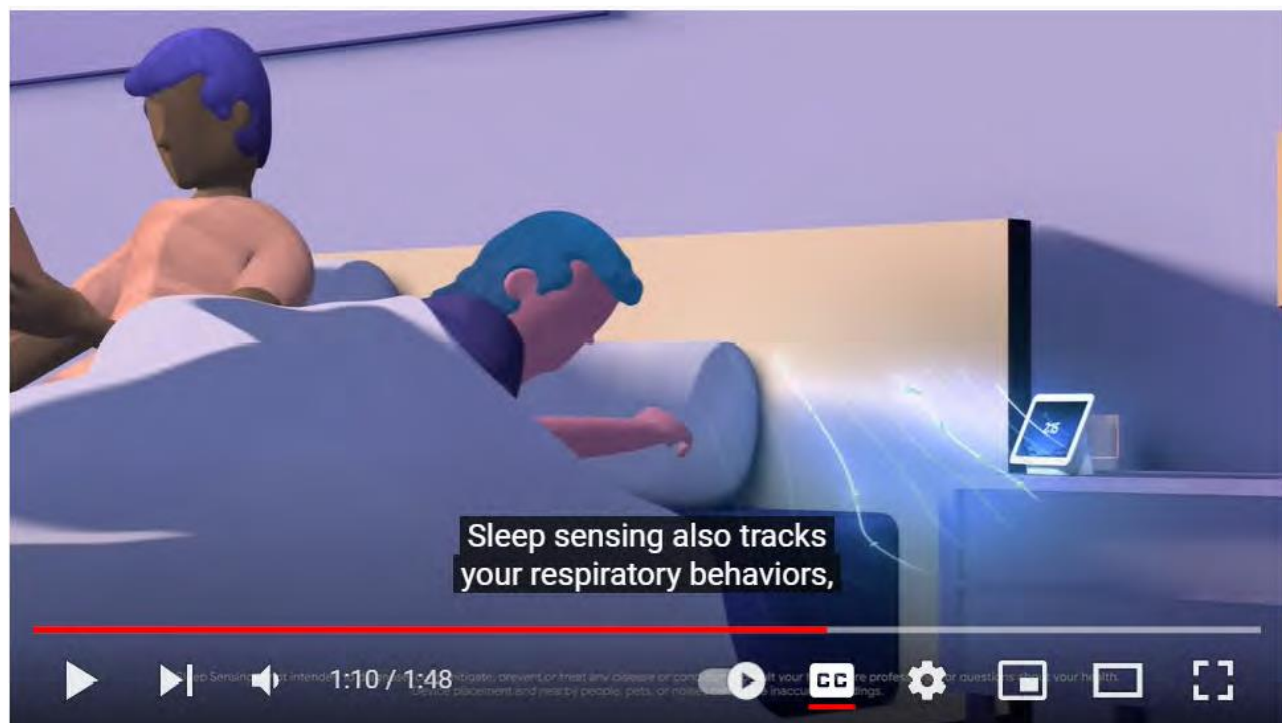
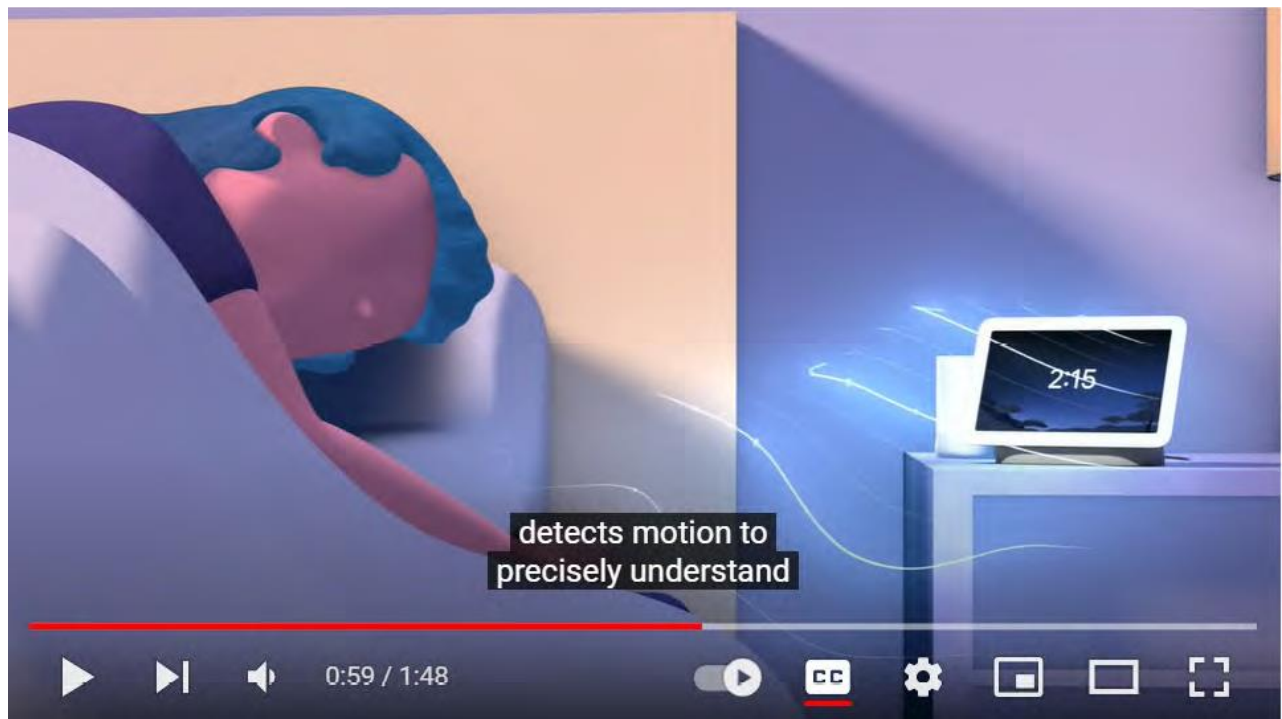
Source: <https://electronics360.globalspec.com/article/17053/teardown-google-nest-hub-2nd-gen>



Source: <https://www.youtube.com/watch?v=vLjHeViM1ic>, Time 1:52

63. Once Sleep Sensing is initiated, the Google Nest Hub 2nd Gen uses the Soli radar Motion Sense technology to detect the movement of a person in order to track their sleep and generates a new Sleep Summary notification alert.

64. Sleep Sensing detects the sleeping user's movements during sleep using radar via the Soli radar chip's Motion Sense technology in order to measure the user's measurements and then change characteristics of the Sleep Sense Sleep Summary notification alerts.



Source: <https://www.youtube.com/watch?v=oKRA6GhlthM&t=4s>, Time :59 & 1 :10

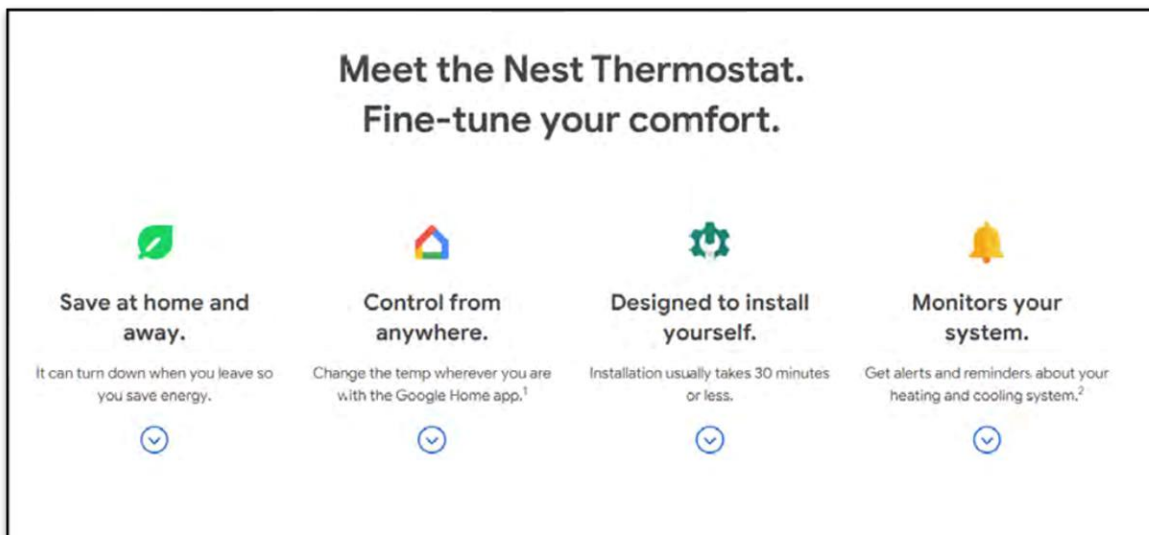
65. The Nest Thermostat is a smart thermostat device provided by Google. The Nest Thermostat ships with the Soli radar chip that provides Presence Sensing that uses radar

technology to provide energy-efficient heating and cooling options for temperature-controlled environments. See <https://atap.google.com/soli/products/#nest-thermostat>.



Source: https://store.google.com/us/product/nest_thermostat?hl=en-US

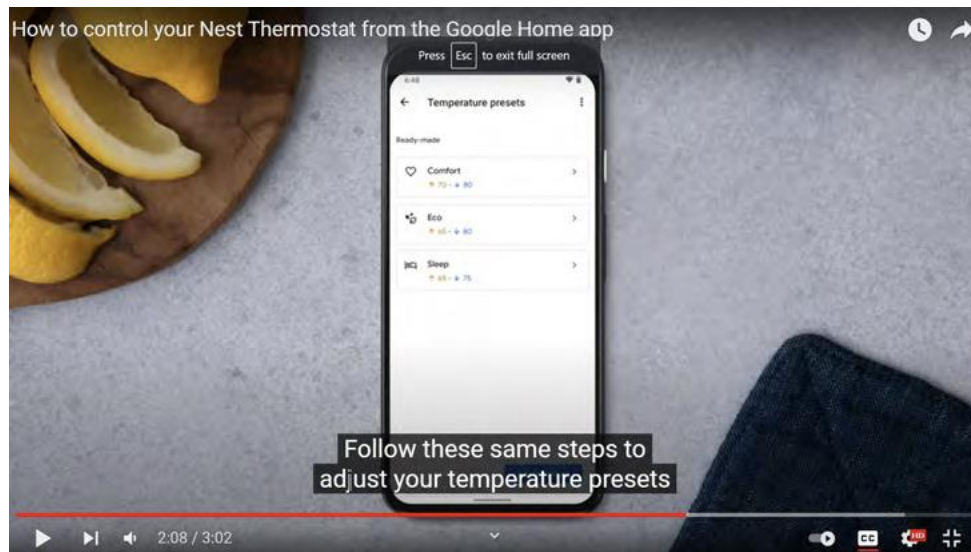
66. The Nest Thermostat interfaces with a mobile communication device running the Google Home application provided by Google on an operating system, such as Android, iOS, etc., to change thermostat modes such as Eco, Comfort, etc., based on Presence Sensing.



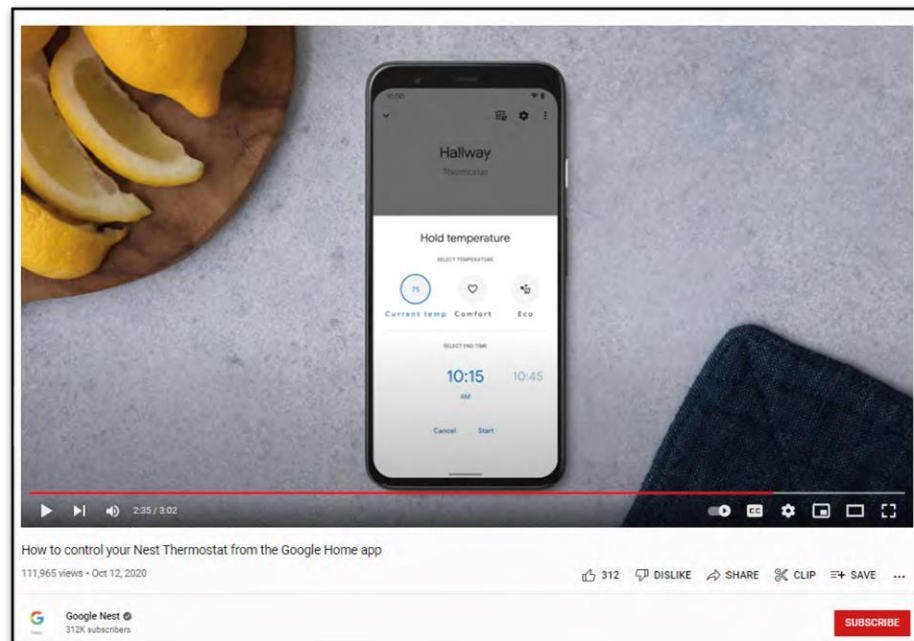
Source: https://store.google.com/us/product/nest_thermostat?hl=en-US

67. The Nest Thermostat and the Google Home App store a schedule for the temperature preset for a defined time frame, such as a week, day, or month. Google Home and

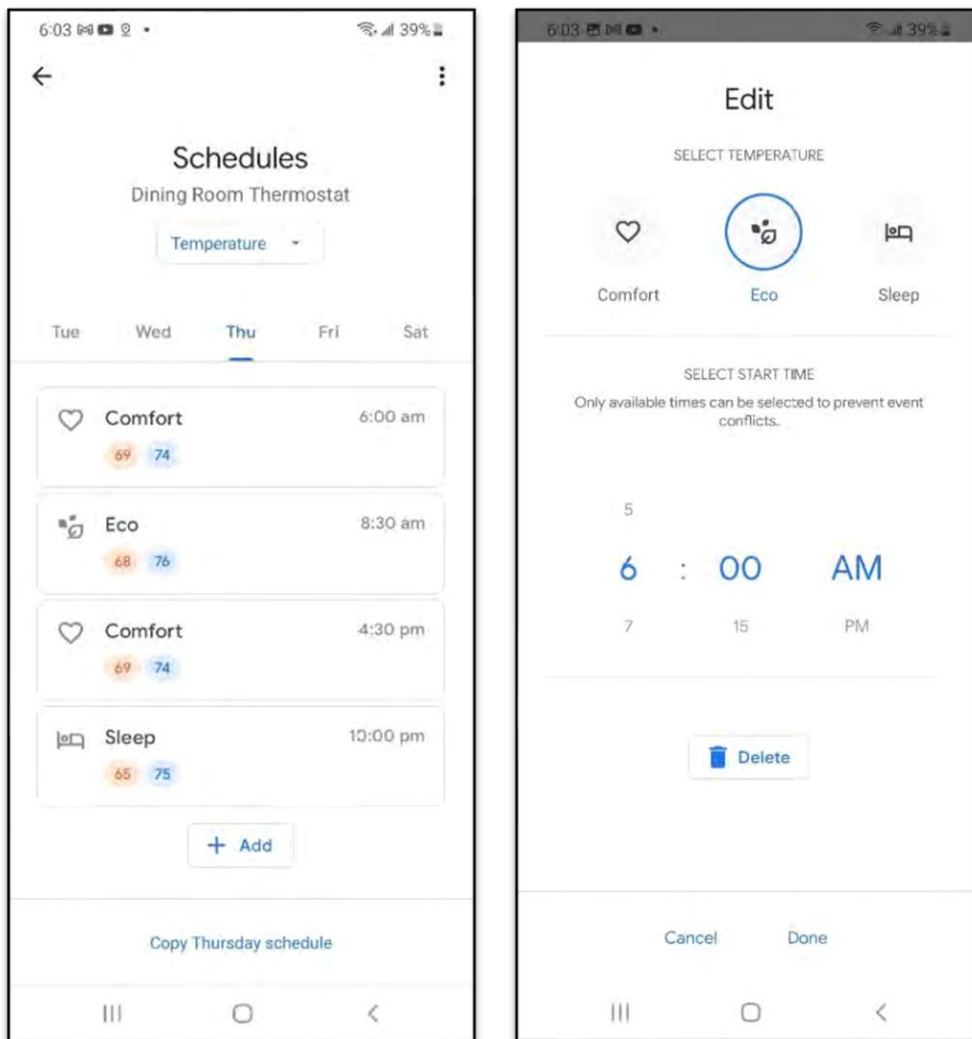
detects the time and triggers a user notification alert indicating a change in temperature preset to the Google Home App & Thermostat according to the schedule.



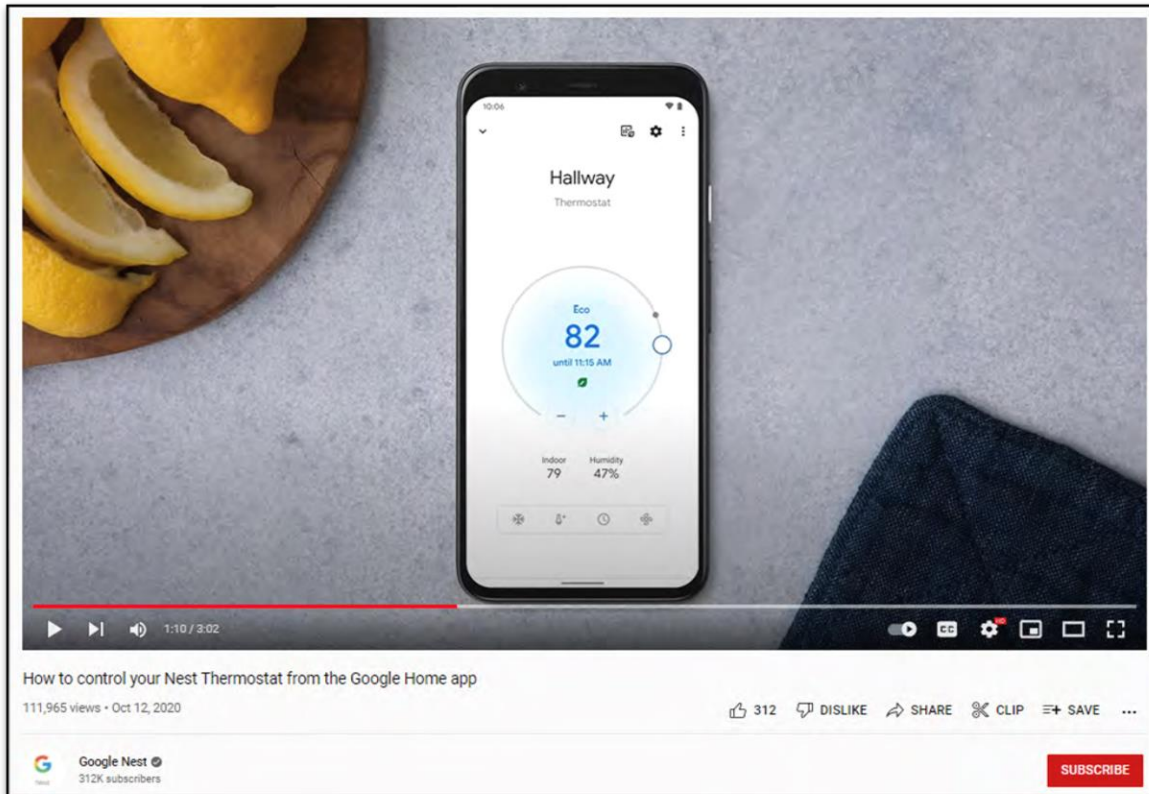
Source: <https://www.youtube.com/watch?v=hRVlQ05Jve8>, Timestamp 2:08



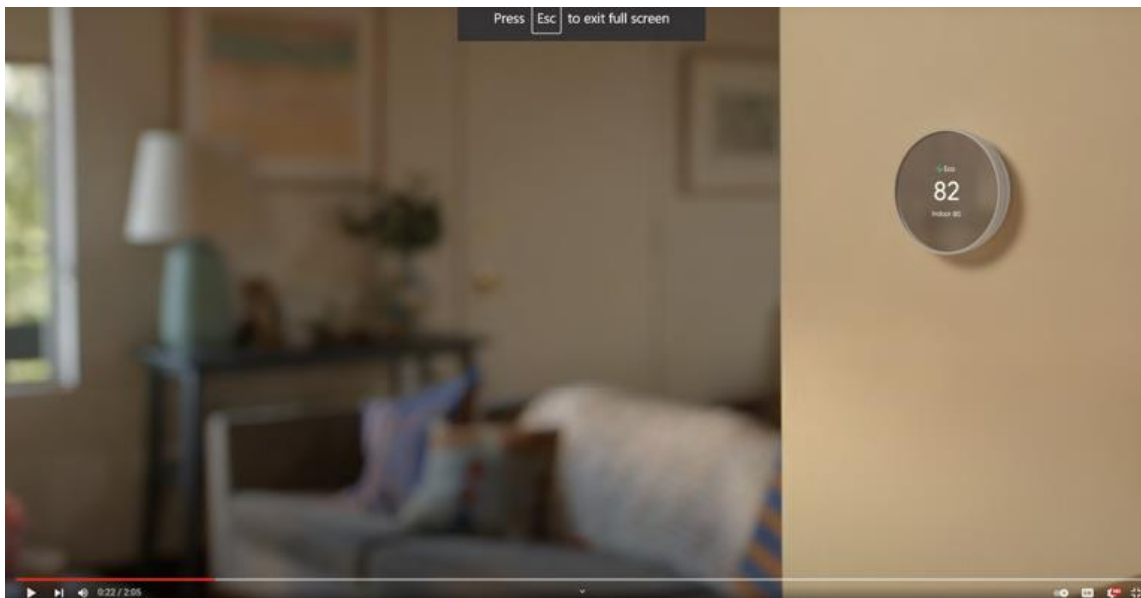
Source: <https://www.youtube.com/watch?v=hRVlQ05Jve8>, Timestamp 2:35



68. The Nest Thermostat and Google Home will detect the time and trigger the change in temperature preset according to the schedule—e.g., from Comfort to Eco, or from Sleep to Comfort, etc. The change is transmitted from Google Home app as a user notification alert to Nest Thermostat and Google Home App.



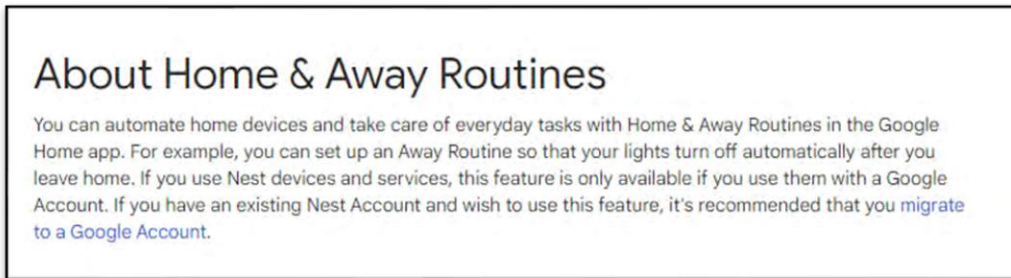
Source: <https://www.youtube.com/watch?v=hRVlQ05Jve8>, Timestamp 1:10



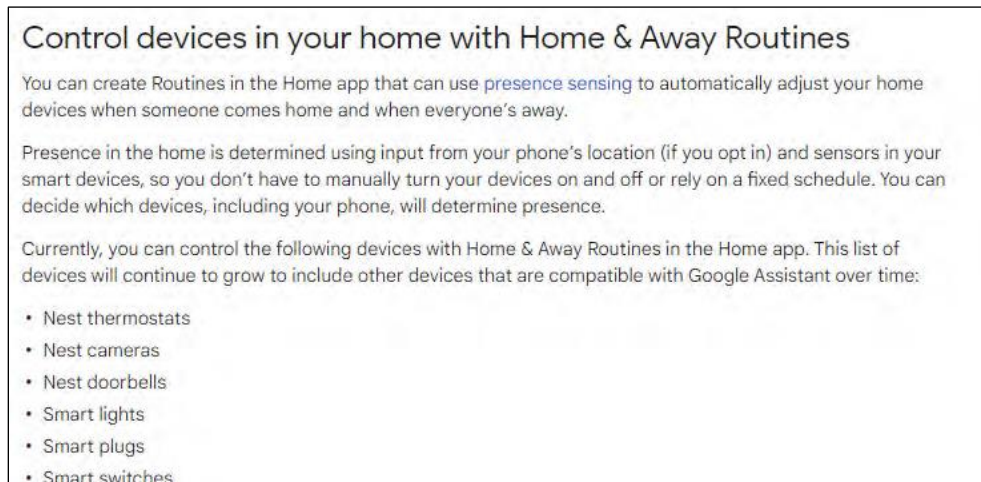
Source: <https://www.youtube.com/watch?v=20367DapHlc>, Timestamp 0:22

69. The Nest thermostat uses its Soli radar chip sensor to detect movement in the house, in response to the detection of the scheduled change of preset temperature. Based on the

movement detection via radar (e.g., whether a person is present or not), the Google Home App on the mobile communication device receives notifications from the Nest Thermostat (e.g., indicating to the Google Home app if the user is at home or away based on the detection of movement by radar).



Source: <https://support.google.com/googlenest/answer/10071816?hl=en>



Source: <https://support.google.com/googlenest/answer/10071816?hl=en>

Change Home & Away Routines settings

Note: These instructions are for devices you manage in the Google Home app. You can find instructions on [How to change Home/Away Assist settings](#) in the Nest app in our help center.

Set up Home & Away Routines for your home

To set up Home & Away Routines for the first time:

1. Open the Google Home app > tap Set up Home & Away Routines.
2. Tap Home or Away.
3. Select the devices and settings you want the Routines to adjust.
 - a. Select the ones you want to change when the first person comes home.
 - b. Select the ones you want to change when everyone's away.
4. (Optional) Select the devices you want to use to determine if someone's home.
5. (Optional) Set up your phone's location to be used for presence sensing.
 - a. You'll need to enter your home address and confirm it by placing a pin on a map.

Source: <https://support.google.com/googlenest/answer/10071810>

70. The method practiced by the Google Home app in combination with the Nest Thermostat comprises changing characteristics of the user notification alert based on the step of detecting movement. Google Home App uses radar sensor information from the Nest Thermostat to help determine whether a user is at home. This information determines the presence or absence of a user inside the home. If no presence is detected the mode will change from the current mode (e.g., Comfort Mode) to an Eco Mode. The mode change is updated to Google Home app as a user notification alert, which will now display a “Nest Leaf” with “Eco” Mode.

Your Google Nest thermostat can automatically switch to Eco Temperatures after it senses that nobody's home. You'll know Eco Temperatures are active when you see Eco on your thermostat and in the Nest or Google Home app. You can also set Eco Temperatures when you are at home to help save energy.

Eco Temperatures are just one way your Nest thermostat can help you save energy. [Learn more about how to improve energy savings.](#)



Your thermostat can automatically switch to Eco Temperature when everyone's away and switch to a more comfortable temperature when someone comes home.

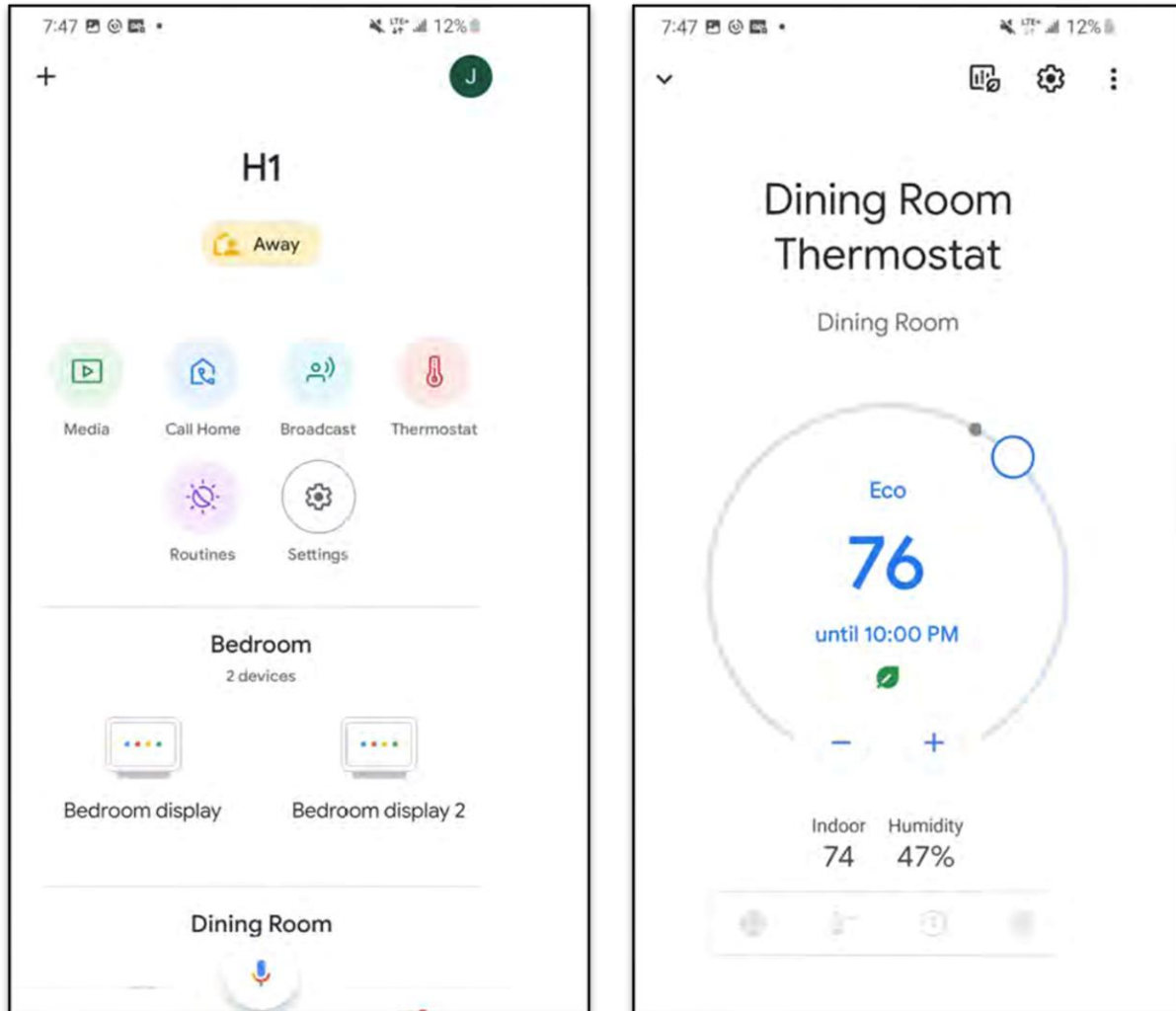
If you have a Nest Thermostat, you'll need to set up [Home & Away Routines](#) to enable automatic switching.

If you have a Nest Learning Thermostat or Nest Thermostat E, you'll need to set up [Home/Away Assist](#) to enable automatic switching.

[How to tell which thermostat you have](#)

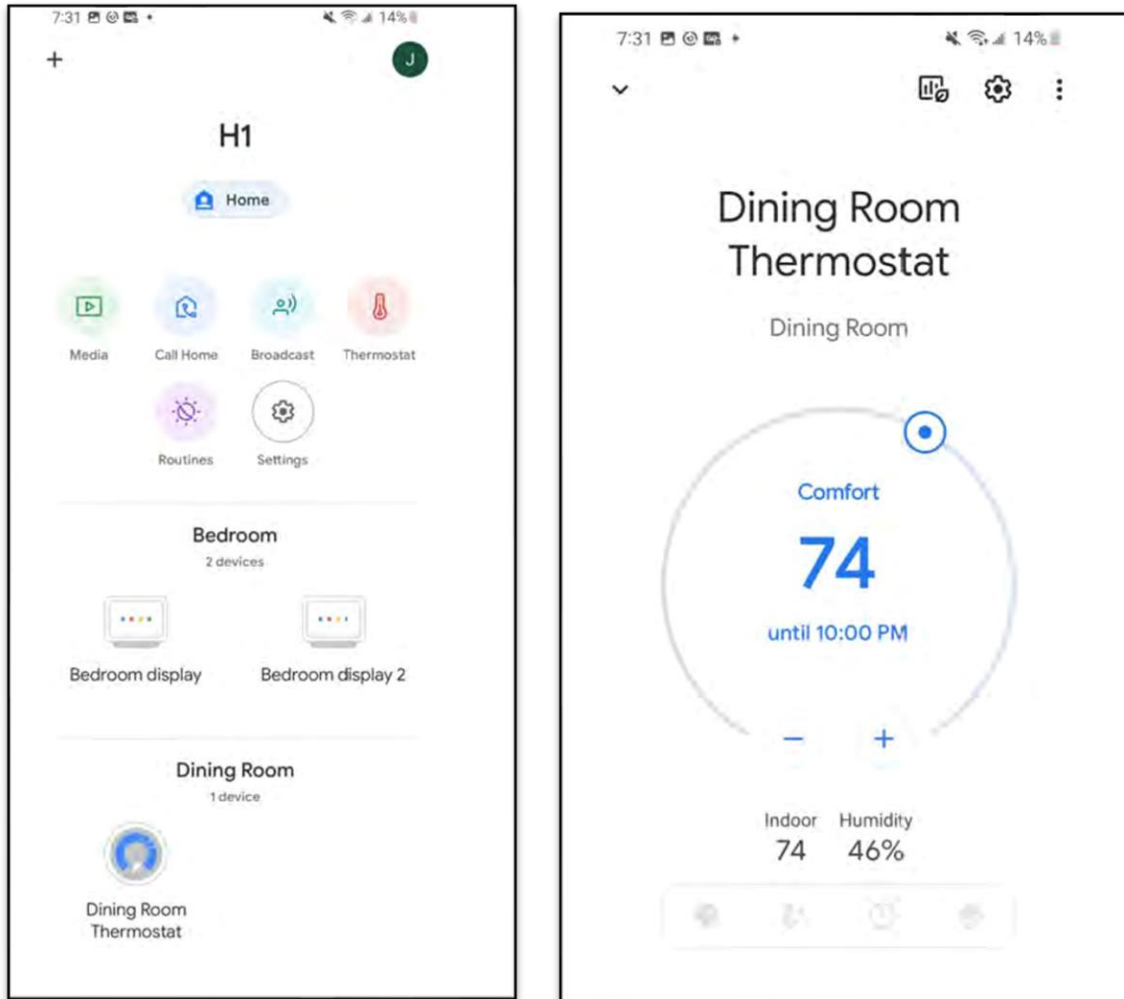
- Your Nest thermostat uses its own activity sensors, sensor data from your other Google Nest products, and your phone's location to tell when everyone has left or someone has come home.
- When everyone has left, your thermostat will wait a short while to make sure nobody's coming back, then it will automatically switch to Eco Temperatures.
 - **Note:** Your thermostat may wait up to 1-2 hours before switching to Eco temperatures if you're using device sensors to sense your presence in the home, and the sensors detect activity around the time everyone leaves. This longer wait time will happen even if you're also using phone location to help tell if you're home or not. To avoid this situation, use only phone location to sense presence and disable the other device sensors in your home's presence settings.
- If your thermostat has automatically switched to Eco Temperatures, it will switch back to its regular heating or cooling schedule when someone returns home.
- Your thermostat will also switch to Eco Temperatures if you manually switch your home to Away mode with the Nest or Home app.

Source: <https://support.google.com/googlenest/answer/9245535?hl=en&co=GENIE.Platform%3DAndroid#zippy=%2Cseteco-temperatures-to-turn-on-automatically-when-everyones-away>

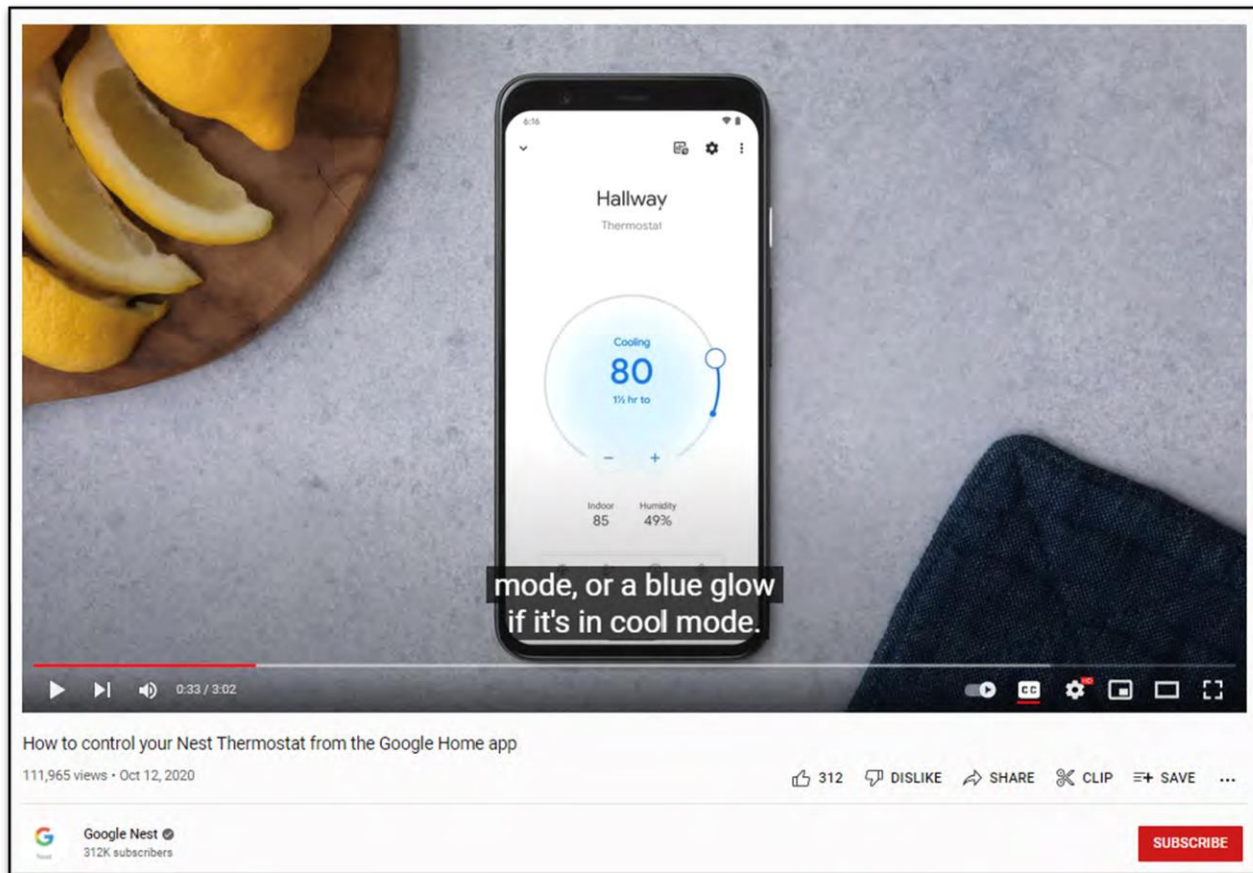


71. Based on the presence detection of a person using the Soli radar chip in the Nest Thermostat, the mode changes from Eco mode to a configured default mode at the scheduled time (e.g., comfort mode, sleep mode). The mode change is updated to Google Home as a user notification alert.

72. When the Soli Radar chip in the Nest Thermostat detects movement via radar, the display activates confirming presence of a person and the mode changes in the Google Home App and Nest Thermostat from Eco to Comfort.



73. Additionally, the Google Home App will notify the user of the transition from Eco Mode to Comfort Mode based on the Soli chip Presence Sensing by displaying a blue glow, if the device is in cooling mode, or a red glow, if the device is in heating mode.



Source: <https://www.youtube.com/watch?v=hRVIQ05Jve8>, Timestamp 0:33



74. The mode change is updated to Google Home. Nest Thermostat and Google Home thus receive user notification alerts, which will display a “Nest Leaf” with the text “Eco.”

Your Google Nest thermostat can automatically switch to Eco Temperatures after it senses that nobody's home. You'll know Eco Temperatures are active when you see Eco on your thermostat and in the Nest or Google Home app. You can also set Eco Temperatures when you are at home to help save energy.

Eco Temperatures are just one way your Nest thermostat can help you save energy. [Learn more about how to improve energy savings.](#)



Your thermostat can automatically switch to Eco Temperature when everyone's away and switch to a more comfortable temperature when someone comes home.

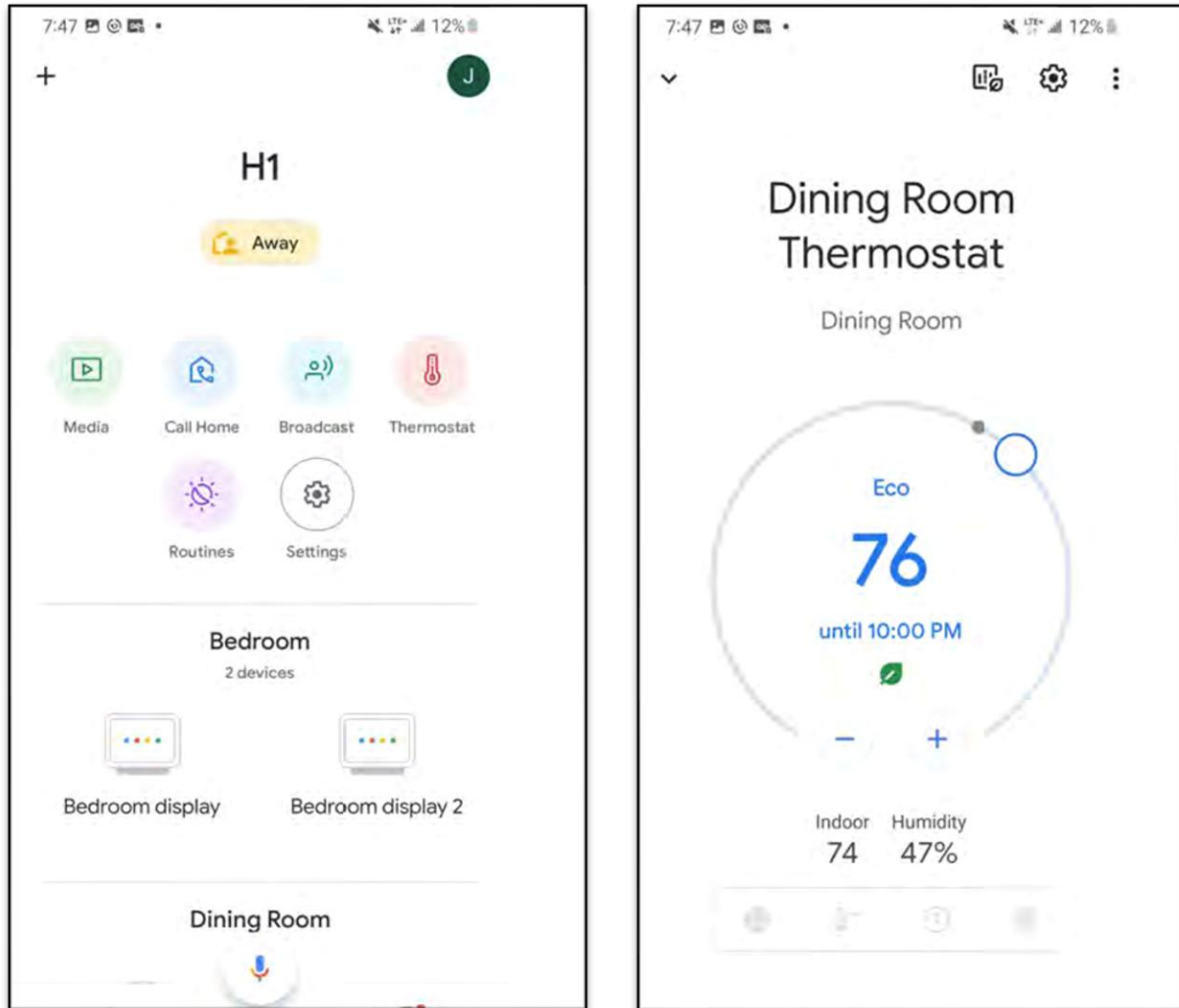
If you have a Nest Thermostat, you'll need to set up [Home & Away Routines](#) to enable automatic switching.

If you have a Nest Learning Thermostat or Nest Thermostat E, you'll need to set up [Home/Away Assist](#) to enable automatic switching.

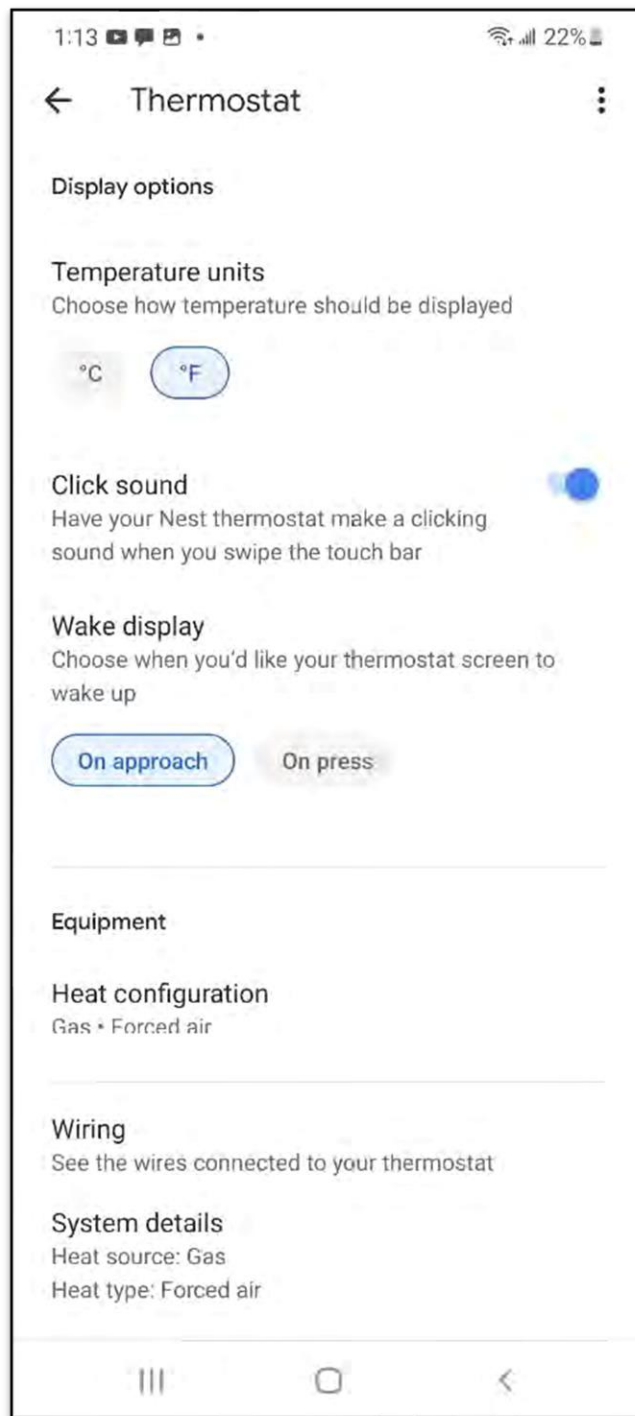
[How to tell which thermostat you have](#)

- Your Nest thermostat uses its own activity sensors, sensor data from your other Google Nest products, and your phone's location to tell when everyone has left or someone has come home.
- When everyone has left, your thermostat will wait a short while to make sure nobody's coming back, then it will automatically switch to Eco Temperatures.
 - **Note:** Your thermostat may wait up to 1-2 hours before switching to Eco temperatures if you're using device sensors to sense your presence in the home, and the sensors detect activity around the time everyone leaves. This longer wait time will happen even if you're also using phone location to help tell if you're home or not. To avoid this situation, use only phone location to sense presence and disable the other device sensors in your home's presence settings.
- If your thermostat has automatically switched to Eco Temperatures, it will switch back to its regular heating or cooling schedule when someone returns home.
- Your thermostat will also switch to Eco Temperatures if you manually switch your home to Away mode with the Nest or Home app.

Source: <https://support.google.com/googlenest/answer/9245535?hl=en&co=GENIE.Platform%3DAndroid&zippy=%2Cseteco-temperatures-to-turn-on-automatically-when-everyones-away>



75. Based on information and belief, the Soli radar chip in the Google Nest Thermostat detects the presence of a user and indicates the detection of a user by activating the display and updating the Google Home app when a user's direction is moving towards or away from the Nest Thermostat.



76. In view of preceding paragraphs, each and every element of at least claim 1, as well as those claims further detailed in Brazos's Infringement Contentions, of the '697 Patent, is found in the Accused Products.

77. Google continues to directly infringe at least one claim of the ‘697 Patent, literally or under the doctrine of equivalents, by making, using, selling, offering for sale, importing, and/or distributing the Accused Products in the United States, including within this judicial district, without the authority of Brazos.

78. To the extent required, Brazos has complied with the marking requirements of 35 U.S.C. § 287(a) with respect to the ‘697 Patent. Neither Brazos nor its predecessor in interest with respect to the ‘697 Patent have sold any products in the United States that practice the ‘697 Patent. Furthermore, according to Brazos’s present knowledge, no Brazos licensee has sold any product in the United States that practices the ‘697 Patent.

79. Google has received notice and actual or constructive knowledge of the ‘697 Patent since at least the date of service of Brazos’s original complaint filed June 29, 2020 (ECF No. 1) (“Original Complaint”).

80. Since at least the date of service of the Original Complaint, through its actions, Google has actively induced product makers, distributors, retailers, and/or end users of the Accused Products to infringe the ‘697 Patent throughout the United States, including within this judicial district, by, among other things, advertising and promoting the use of the Accused Products in various websites, including providing and disseminating product descriptions, operating manuals, and other instructions on how to implement and configure the Accused Products. Examples of such advertising, promoting, and/or instructing include the documents at:

- https://store.google.com/us/product/pixel_4
- https://store.google.com/us/product/pixel_4_specs
- https://youtu.be/tx_1_WaKCuo
- <https://youtu.be/dDqH9EstUsA>
- <https://ai.googleblog.com/2020/03/soli-radar-based-perception-and.html>
- <https://youtu.be/mvvHEYjtsnI>
- <https://youtu.be/LRhr3XCcp4Y>

- https://store.google.com/us/product/nest_hub_2nd_gen
- https://store.google.com/us/product/nest_hub_2nd_gen_specs
- <https://youtu.be/elXc31VDOIE>
- https://store.google.com/us/product/nest_thermostat
- https://store.google.com/us/product/nest_thermostat_specs
- <https://youtu.be/cD4ZVG3C7As>
- <https://youtu.be/hRVIQ05Jve8>
- https://youtu.be/HeE1IdOu0_8

81. Since at least the date of service of the Original Complaint, through its actions, Google has contributed to the infringement of the ‘697 Patent by having others sell, offer for sale, or use the Accused Products throughout the United States, including within this judicial district, with knowledge that the Accused Products infringe the ‘697 Patent. The Accused Products are especially made for or adapted for infringing the ‘697 Patent and have no substantial non-infringing use. For example, in view of the preceding paragraphs, the Accused Products contain functionality which is material to at least one claim of the ‘697 Patent.

82. In addition, on information and belief from at least as early as the filing of the Original Complaint, Google has infringed the ‘697 Patent, has known of its infringement, has disregarded an objectively high likelihood of infringement of the ‘697 Patent, and has acted, and/or continues to act, willfully, wantonly, and in deliberate disregard of Brazos’s rights by at least developing and releasing new infringing products (the Google Nest Hub 2nd Generation and the Google Nest Thermostat (“Accused Nest Products”)) utilizing the accused instrumentality.

83. In particular, the Original Complaint identified the Accused Instrumentality as “products such as, but not limited to, user notification alerts based on the object movement detected using radar (collectively, the ‘Accused Products’).” ECF No. 1 ¶ 45. Brazos also provided further details regarding the Accused Products including specifically identifying “devices that utilize Motion Sense such as, but not limited to the Pixel 4 (including the XL variant).” *Id.* ¶ 46.

84. Google willfully disregarded these notices of infringement provided in the Original Complaint and instead chose to develop and release the Nest Hub 2nd Generation on March 30, 2021, with multiple infringing features based on Motion Sense, including Quick Gestures and Sleep Sense, nine months after receiving the Original Complaint.

85. Upon information and belief, Google also attempted to conceal Nest Hub 2nd Generation's infringement by neglecting to identify it as a potential Accused Product during litigation and instructing its employees not to publicly disclose certain information about the product until it believed this case would be dismissed.

86. Upon information and belief, both the subsequent and continued development and release of the Nest Hub 2nd Gen and/or the refusal to identify the Nest Hub 2nd Gen as an Accused Product was at least willful and deliberate, as Google acknowledges that the Nest Hub 2nd Gen's Quick Gestures and Sleep Sense features were directly related to or derived from the accused Motion Sense features of the Pixel 4.

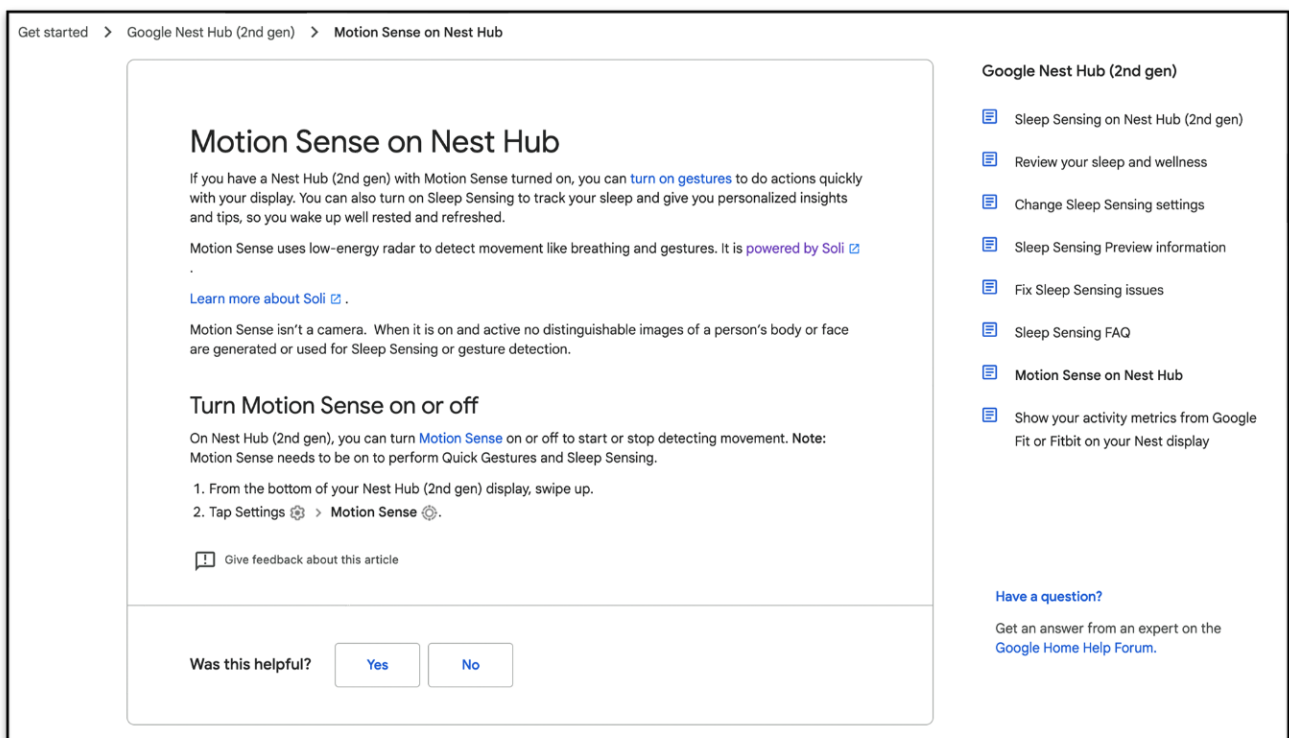
87. Specifically, Google claims that the "Pixel 4 was the first device with Soli, powering Motion Sense which allows you to skip songs, snooze alarms, and silence phone calls without touching your phone." See <https://atap.google.com/soli/products/#pixel-4>. Similarly, Google describes the Nest Hub 2nd Gen Quick Gestures as "Quick Gestures help you quickly take action and focus on what matters. Play or pause a song or video, snooze an alarm, or even stop a timer with a wave of your hand." See <https://atap.google.com/soli/products/#nest-hub>.

88. Google also acknowledges that the Nest Hub 2nd Generation Quick Gestures is an evolution of the Pixel 4 Motion Sense gesture technology:

For the Nest Hub, our team tuned Soli's radar settings for an expanded gesture sensing range of 3m. This allows for natural interactions in a larger area of the home. In order to deliver this, we collected a new dataset of gesture samples and updated our model architecture to improve performance.

See <https://atap.google.com/soli/products/#nest-hub>.

89. Furthermore, though Google’s product marketing of the Nest Hub 2nd Gen focuses on the phrase “Quick Gestures” and uses the language “Motion Sense” in connection with the Pixel 4, Google’s March 2022 marketing materials reveal that Google treats both terms as part of the same product feature ecosystem. The screenshots below from a product support web page for the Google Nest Hub 2nd Gen that appeared in March 2022 show that Google considers the accused Pixel 4’s Motion Sense technology to include the Google Nest Hub 2nd Gen’s Quick Gestures and Sleep Sensing features:



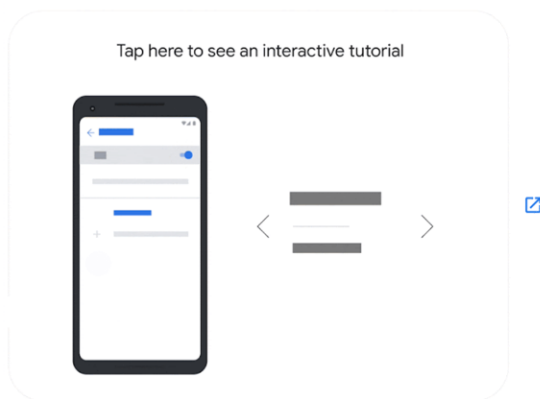
Source: <https://support.google.com/googlenest/answer/10388741?hl=en>

Turn Motion Sense on or off

1. On your Pixel 4, open the Settings app.
2. Tap **System** > **Motion Sense**.
3. Turn on **Motion Sense**.

When Motion Sense is on and active:

- You'll sometimes see a light blue glow at the top of the screen. This glow shows you that a quick gesture is available, or that you just used a gesture.
- Motion Sense can tell when you're nearby, but not who you are.
- Motion Sense isn't a camera.
- All Motion Sense processing happens on your phone. Sensor signal data isn't sent to Google.



Do actions quickly with quick gestures

Silence interruptions

You can wave across your phone to snooze an alarm, turn off a timer, or mute a call.

1. Set an alarm, set a timer, or get a call.
2. When it goes off, wave your hand once across your screen.

Waving across your phone won't turn off the alarm or decline the call. Instead, your phone snoozes the alarm, silences the call, or makes the sound quieter when you reach for your phone.

Source: <https://support.google.com/pixelphone/answer/9517454?hl=en>

90. In addition, Google further acknowledged in a developer blog that the infringing Nest Hub 2nd Gen Sleep Sense feature technology is directly related to the accused Pixel 4 Motion Sense feature:

Soli for Sleep Tracking

Sleep Sensing in Nest Hub demonstrates the first wellness application of Soli, a miniature radar sensor that can be used for gesture sensing at various scales, from a finger tap to movements of a person's body. In Pixel 4, Soli powers Motion Sense, enabling touchless interactions with the phone to skip songs, snooze alarms, and silence phone calls. We extended this technology and developed an embedded Soli-based algorithm that could be implemented in Nest Hub for sleep tracking.

Soli consists of a millimeter-wave frequency-modulated continuous wave (FMCW) radar transceiver that emits an ultra-low power radio wave and measures the reflected signal from the scene of interest. The frequency spectrum of the reflected signal contains an aggregate representation of the distance and velocity of objects within the scene. This signal can be processed to isolate a specified range of interest, such as a user's sleeping area, and to detect and characterize a wide range of motions within this region, ranging from large body movements to sub-centimeter respiration.

See <https://ai.googleblog.com/2021/03/contactless-sleep-sensing-in-nest-hub.html/>.

91. Google has also willfully infringed and induced infringement of the '697 Patent via its Google Home application in combination with the Nest Thermostat. Despite being on notice of the definition of Accused Products in Brazos's Original Complaint as "products such as, but not limited to, user notification alerts based on the object movement detected using radar (collectively, the 'Accused Products')" (ECF No. 1 ¶ 45) as of June 2020, Google proceeded with the development and launch of the Nest Thermostat in October 2020 and also did not identify the Nest Thermostat's operation in combination with the Google Home app as a potential Accused Product in response to discovery.

92. Indeed, Google acknowledges on its Soli radar chip website—in portions updated in March 2022—that the Google Nest Thermostat senses motion using radar, stating that "the Nest Thermostat . . . uses Soli technology to help create a borderless, mirrored display and sense motion," and "[t]he Soli sensor is integrated into the mirror display. Since the radar signal penetrates through the plastic and glass, the enclosure is seamless without the need for an aperture." See <https://atap.google.com/soli/products/#nest-thermostat>.

93. During the litigation, Brazos requested that Google confirm that discovery accounted for "all documents relating to incorporation of Soli in Google products other than Pixel

4” (Dec. 8, 2021). But at no point did Google identify any additional products, including either the Google Nest Hub 2nd Generation or the Google Home application in combination with the Nest Thermostat. Google instead repeatedly represented that “Pixel 4 and 4XL are the only mobile communication devices that include Soli” (Dec. 15, 2021) and “the only phones that included Motion Sense were the Pixel 4 and 4XL phones” (Jan. 14, 2022).

94. Google moreover continually pressured Brazos to dismiss this case based upon Google’s representations of a purportedly low value of the damages base in this case because the only identified Accused Product was the Pixel 4.

95. Indeed, in March 2022 Google apparently mistakenly believed that it had succeeded in convincing Brazos to dismiss the case on that basis. Google concurrently updated its website devoted to the Soli radar chip (<https://atap.google.com/soli/products/>), where it added the Nest Thermostat and the Nest Hub 2nd Gen alongside the previously accused Pixel 4 as products also incorporating the same Soli radar chip and provided descriptions how those products similarly incorporate gestures and motion sensing technologies. *Compare* Archived Soli Main Page from February 23, 2022: <https://web.archive.org/web/20220223202957/https://atap.google.com/soli/> with Archived Soli Main Page from March 2, 2022: <https://web.archive.org/web/20220302225919/https://atap.google.com/soli/> and Archived Soli Product Page from March 3, 2022: <https://web.archive.org/web/20220303093005/https://atap.google.com/soli/products/>.

96. Also in March 2022, Google posted a product support webpage for the Google Nest Hub 2nd Gen explaining how its Quick Gestures and Sleep Sense features are a part of the Pixel 4’s accused Motion Sense technology. *See* <https://web.archive.org/web/20220301182327/https://support.google.com/googlenest/answer/10388741?hl=en>.

97. When Brazos located this newly disclosed public information, and promptly proposed to amend its contentions to add the Nest Thermostat and the Nest Hub 2nd Gen as

Accused Products in April 2022, Google refused to consent to Brazos's proposed amendment, and on April 22, 2022 informed Brazos that Google intended to pursue attorneys' fees under 35 U.S.C. Section 287 unless Brazos dismissed this case based upon Google's interpretation of claim language.

98. When Brazos refused to dismiss this case and requested the basis upon which Google intended to demand attorneys' fees and the basis of Google's claim construction position, Google responded on April 29, 2022 by "provid[ing] WSOU with notice that Google will also seek all appropriate relief under Fed. R. Civ. P. 11(b)(1)-(3)" unless Brazos dismissed this case, without citing intrinsic evidence in support of its claim construction position.

99. On May 6, 2022, Brazos responded by providing citations to the intrinsic and extrinsic basis in the '697 Patent for Brazos's assertions of infringement directed to the Nest Products.

100. On May 9, 2022, Google responded by stating that unless Brazos dismissed this case, in addition to pursuing relief under 28 U.S.C. Section 285 and FRCP 11, Google would seek relief against Brazos's counsel under 35 U.S.C. Section 1927, directed to "multipl[ying] the proceedings in any case unreasonably and vexatiously." Google's correspondence still omitted citation to its own intrinsic evidence in support of Google's claim construction position, and instead merely criticized Brazos's cited evidence without substantive explanation.

101. The foregoing constitutes basis for post-Original Complaint willful infringement and/or at least enhanced damages and attorneys' fees, based upon the continued development, sale, use, and induced infringement, of new infringing products and litigation conduct post-filing of the Original Complaint, including Google's failure to disclose potential Accused Products during litigation and concealment of information directly related to the Accused Products until such time as Google wrongfully believed that it had succeeded in pressuring Brazos to dismiss this case, and

thereafter including Google's continuing efforts to force Brazos to dismiss this case based on escalating threats of sanctions and fees based on Google's unilaterally adopted claim construction position.

JURY DEMAND

Brazos hereby demands a jury on all issues so triable.

REQUEST FOR RELIEF

WHEREFORE, Brazos respectfully requests that the Court:

(A) Enter judgment that Google infringes one or more claims of the '697 Patent literally and/or under the doctrine of equivalents;

(B) Enter judgment that Google has induced infringement and continue to induce infringement of one or more claims of the '697 Patent;

(C) Enter judgment that Google has contributed to and continue to contribute to the infringement of one or more claims of the '697 Patent;

(D) Award Brazos damages, to be paid by Google in an amount adequate to compensate Brazos for such damages, together with pre-judgment and post-judgment interest for the infringement by Google of the '697 Patent through the date such judgment is entered in accordance with 35 U.S.C. § 284, and increase such award by up to three times the amount found or assessed in accordance with 35 U.S.C. § 284;

(E) Declare this case exceptional pursuant to 35 U.S.C. § 285; and

(F) Award Brazos its costs, disbursements, attorneys' fees, and such further and additional relief as is deemed appropriate by this Court.

Dated: May 20, 2022

Respectfully submitted,

FOLIO LAW GROUP PLLC

/s/ Joseph M. Abraham

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Timothy Dewberry, TX Bar No. 24090074

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